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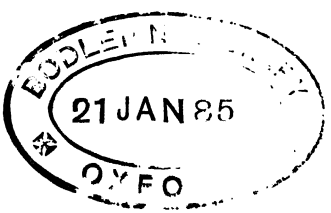

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CONTENTS.

CHAPTER I.

THE STAFF OF THE ARMY.

	PAGE
Staff at Head Quarters.	
The Secretary of State for War and the Commander-in-Chief—The War Office	1
Staff with the Troops.	4
Relations of a Staff Officer towards his Chief and other Officers	10

CHAPTER II.

OFFICE WORK OF STAFF OFFICERS.

Distribution of Work	13
General Rules of Correspondence	15
Form of Letters	17
Receipt and Registry of Letters—Transaction of Business with the Chief	19
Books for Registry—The General Register	21
Letters, Orders, and Instructions	24
Office Work in Time of Peace	
Adjutant-General's Branch	26
Quartermaster-General's Branch	29
Staff Work during Manœuvres	30
The "General Idea" and "Special Ideas"	31
Duties of Staff Officers with General Officers Superintending the Manœuvres	33
Duties of Staff Officers with Officers Commanding one of the Detachments	35
Drawing up Orders in accordance with the General and Special Ideas	35
Umpires—their Duties	39
Staff Work in the Field	
Framing Orders in the Field	39
Communication of Orders in the Field	46
Heliograph and Telegraph	47
Cipher Messages	48
Office Work and Correspondence in the Field	50

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CHAPTER III.

DUTIES OF STAFF OFFICERS ON THE LINE OF COMMUNICATIONS.

	PAGE
The Line of Communications—Introductory Remarks ..	52
General Principles of Organisation	53
The General of Communications and his Staff	55
Distribution of his command	55
The Base of Operations—Organisation of the Base	56
Relations between Military and Naval Authorities as to Landing	57
The Line of Communications—Organisation	63
Staff for Line of Communications	64
Arrangements for Movements along the Line of Communications	65
Protection of Line of Communications	68
Organisation of the Line of Communications in Afghanistan, 1880	72
Organisation of the Line of Communications in Natal, 1881	72

CHAPTER IV.

DUTIES OF STAFF OFFICERS IN MARCHES.

General Observations	74
Marches beyond striking distance of the Enemy	75
General Arrangements	75
Principles guiding assignment of Roads	77
Length of March	79
Notable instances of Prolonged Marches	79
Halts	81
Means of Accelerating Marches	82
Notable instances of Forced Marches	83
Marches within striking distance of the Enemy	86
Offensive Movements	
Order of March of Main Body..	87
Limit to number of Troops in one Column ..	87
Considerations as to front and depth of the Marching Area	88
Selection of Roads..	91
Distribution of the Troops in the Columns ..	92
Position of the Combatant Arms in the Column	92
Order of March of Trains..	95
Distances allowed between Units on the March..	96
Spaces occupied by different Units on the March (Table)	98
Measures of security on the March—Advanced Guard	99
General Observations	99
The Cavalry Division in front of an Army ..	102
Object of Advanced Guard	107
Strength of Advanced Guard	108

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PAGE

Measures of security on the March (*continued*)
Composition of Advanced Guard 108
Order of March of „ 110
Arrangement of Marches in proximity of Enemy .. 112
General Observations 112
Halts 116
Concealment of Marches 117
Combination of Marches 118
Duties of Commander of Advanced Guard and his Staff 119
Marches in Retreat 122
Object of Retreating Force 122
Order of March 123
Rear Guard; its strength, composition, and order of March 124
Duties of Commander of Rear Guard and his Staff.. 126
Flank Marches 126
Object of Flank March.. 127
Marching Area 128
March of Trains.. 129
Flank Guard; its strength, composition, and order of March 130
Task of Flank Guard 130
Night Marches 131
Orders for the March 132
General Observations 132
Orders of Army Commanders and Army Corps Commanders 134
Orders of Divisional General 138
Tables showing establishments of the chief units 144

CHAPTER V.

DUTIES OF STAFF OFFICERS IN CANTONMENTS, CAMPS, AND BIVOUACS.

Introduction 147
Conditions to be satisfied in the Accommodation of Troops when Halted 150
Application of Cantonments and Bivouacs to circumstances of War 151
Cantonments or Quarters.
Classed as (1) Ordinary; (2) Close 153
Applicability of the two classes to the circumstances 154
Considerations as to Selection and Limits of the Cantonment Area 155
Principles of Distribution of the Area among Units.. 156
Rendezvous Positions and Alarm Posts 157
Assignment of Cantonments to the different Arms—Position of Head Quarters 158
Cantonments before Fortresses.. 160
Accommodation of houses and buildings for quartering Troops, (1) for a prolonged halt, (2) on the line of March 160

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PAGE

Cantonments, &c.
Mode of Estimating Accommodation 162
Reports on Cantonments 164
Measures of Security, (1) Internal, (2) External .. 165
Bivouacs 168
Selection of Site, Conditions affecting 169
(1) Military; (2) Sanitary and Comfort.—Suitable and Unsuitable Ground considered 169
Bivouac Requisites 172
(1) Water.—Amount of Water necessary for Troops —Mode of Estimating Supply of Stream—Water from Wells, &c. 172
(2) Wood 174
(3) Straw 175
Distribution of Troops in Bivouac 175
Form of Bivouacs 176
Encampments 178
Principles guiding allotment of space 178
Size of Encampments for different Units (Table).. .. 180
Indian Camps 180
Sanitary Arrangements in Camps and Bivouacs.. .. . 182
Detail of Tentage for an Army Corps (Tables) 184–5

CHAPTER VI.

DUTIES OF STAFF OFFICERS WITH TRANSPORT BY LAND.

Introductory Observations.. 186
Transport consists of—(1) Transport with the Field Force, (2) Transport on the Line of Communications 188
Transport with Field Force classed as—
(1) Regimental, (2) Departmental.. 189
Regimental Transport.
Regimental Transport according to Mobilisation Tables .. 189
Departmental Transport, divided into (1) 1st Line, (2) 2nd Line, and (3) Advanced Depôt 190
Transport in Egypt, 1882 191
Table showing distribution of Departmental Transport to Corps and Departments (Mobilisation Tables) .. 193–4
Transport with Troops on the March and in Quarters. General Observations on the principles guiding its proper arrangement and distribution, illustrated by Examples— 195
Example 1.—A Division moving by a single road and operating independently 197
Example 2.—An Army Corps moving by three parallel roads 198
Example 3.—An Army Corps moving by one road .. 199
Transport on the Line of Communication—General Observations 199
Three systems of distribution—(1) Convoy, (2) Staging System, (3) Meeting System 200

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PAGE

Means of Transport and its Organisation. General Observations. Space occupied on the March by Transport 202
(1) Transport by Carriers—General Observations—Organisation of Carriers 203
(2) Transport by Pack Animals—General Observations.. 205
(*a*) Mules, Horses, and Ponies.. 206
(*b*) Bullocks 207
Organisation of a Division of Mules, Horses, Ponies, or Bullocks 208
(*c*) Donkeys 208
(*d*) Camels 208
Organisation of a Division of Camels 209
(*e*) Elephants 209
(3) Transport by Wagons and Carts—General Observations—Organisation of Wagon and Cart Train .. 210
Transport System for Army in India 213
Transport arrangements in Afghan War, 1879–1880 .. 218
" " Zulu War, 1879 219
Table showing equipment of Troops and their Transport for service in India.

CHAPTER VII.

DUTIES OF STAFF OFFICERS IN THE TRANSPORT OF TROOPS BY SEA.

Introductory Observations. 221
Selection of Vessels for Transport purposes 223
Authorities for Transport matters 223
Director of Transports at the Admiralty and the Quarter-master-General 224
Tonnage.
Determination of Tonnage for a given Expedition .. 224
Allowance for Tonnage 226
Tonnage of principal Army Wagons and Carts (Table)
Classification of hired Transports.. 226
Mode of Hiring—Tenders—Charter-parties 227
Fitment of Vessels for transport of Troops, &c... 227
Transports for Men 228
" Horses 229
First Survey by Military and Naval Board 230
Embarkation of Men, Horses, Baggage 230
Time taken in Embarkation 233
Second Survey by Military and Naval Board 234
Embarkation Returns 235
Disembarkation at a Port in friendly country 235
Naval Descents 236
General Observations 236
Embarkation 237
Disembarkation on hostile shore 239
Historical Record of Naval Expeditions within the last century 245

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CHAPTER VIII.

STAFF DUTIES IN CONNECTION WITH RAILWAYS IN WAR.

	PAGE
Introduction	247
Modification in the conduct of war by the introduction of Railways	247
Circumstances in which British Troops may require to move by rail in time of war	253
Duties of Staff Officers in connection with Railways may be classed as (1) Administrative, (2) Executive..	254
Mutual relations of the Military and Railway Authorities	255
Administrative Railway Work	257
Concentration of Troops to resist Invasion at some point of our Coast.—Must be preceded by a study of possible points of Landing..	257
Powers of Her Majesty in the event of threatened Invasion	259
Chief Administrative Authorities.—The Quartermaster-General and the Railway Officials of the Board of Trade	259
Volunteer Railway Staff Corps	260
General Rules as to arrangements of large Transports	260
Chief points to be considered in preparing the strategical concentration of a large body of Troops..	261
Preparation of Time Tables..	267
Military occupation of the Line	267
Executive Railway Work	268
Construction of Railways	268
Working of Railways—Signalling—Block System ..	271
Rolling Stock—Brakes	273
Capacity of Rolling Stock for Military purposes	276
(1) Rolling Stock of Great Britain	276
(2) Rolling Stock of India	281
Stations for Military purposes	285
Their requirements	285
Platforms—Side-loading Platforms	288
Table showing average length of Troop Trains ..	290
End-loading Platforms	292
Ramps	293
Composition of Trains	295
(1) Composition of Trains for United Kingdom ..	296
Table showing Railway Trains required for an Army Corps	298
(2) Continental Trains	299
(3) Composition of Trains in India	300
Time occupied in Entraining and Detraining.	
At Home..	300
In India	302
Defence and Attack of Railways	302
Defence of Railways	302
Attack upon Railways	305

Digitized by Google

PAGE
Destruction of Railways 306
Construction of Field Railways 308
Reconnaissance of a Railway 309
(1) As to Capability for the transport of Troops .. 310
(2) As to its Destruction or Restoration 310
(3) As to neighbouring ground for military purposes. 311
(4) As to suitability for the march of Troops .. 311

CHAPTER IX.

DUTIES OF THE STAFF IN CONNECTION WITH SUPPLY.

Introductory Observations. 312
General conditions affecting Supply 313
(1) Resources of Theatre of War 313
(2) Time of year and climate 314
(3) Character of the War—Offensive or Defensive, and the length of the Line of Operations 314
(4) Rapidity of Movement 314
(5) Propinquity of the Enemy 315
(6) Attitude of the Local Inhabitants 315
Supplies carried with an Army are of two kinds—(1) Movable or Field Reserves, (2) Stationary Reserves 316
Movable or Field Reserves consist of (*a*) Valise Reserve; (*b*) Regimental and Departmental Reserves; and (*c*) Field Magazines 317
Movable or Field Reserves 317
Valise Reserve 318
Regimental and Departmental Reserves 318
Movable or Field Magazines 319
Stationary Magazines or Depôts are classed as Main or Reserve, Intermediate, and Expense 321
Main or Reserve Magazines 321
Intermediate Magazines 322
Expense Magazines—Advanced Depôt 322
Measures for the Supply of Troops in War 323
Supply prior to commencement of Operations 324
Supply during Military Operations.. 328
Agency by which Supplies are obtained 331
Supply by Contract 331
Purchase through the Commissariat 332
Purchases by the Troops 332
Requisitions and Contributions 333
Requisitions in Afghanistan 334
Form of Ration Return employed in Afghanistan .. 336
Form of Ration Return employed in the British Commissariat 339

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STAFF DUTIES.

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Command of the Army.

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Ever since the Restoration, Parliament has had general powers of control in military matters, but it is only of late years that full powers over the details of military administration and expenditure have passed from the Crown to the Secretary of State.

A Secretary at War, as the official was called who for nearly two centuries presided over the Department, is first heard of in the reign of Charles II. His position, from the first, appears to have been an ambiguous one, and his relations to Parliament, to the Crown, to other offices, and to officers connected with the military administration were most ill defined.

This state of things subsisted until the latter part of the 18th century (1795), when the appointment of a Secretary of State for War was made. To this official were entrusted the joint duties of administering the Departments of War and of the Colonies. But the appointment of a Secretary at War continued to be made, and he, in reality, remained the working head of the War Office. In the course of time the so-called Department of War and of the Colonies became known as the Colonial Department alone.

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Union of the separated branches of Army Administration in 1856.

At the commencement of the Crimean Campaign the Departments of War and of the Colonies were separated, and in 1856 our system of military administration substantially assumed its present form. The office of Secretary at War was abolished, the Departments of Ordnance and Commissariat were united with the War Office, the control of the militia, yeomanry, and afterwards of the volunteers was amalgamated with that of the army, and the whole placed under the undivided responsibility of the Secretary of State for War.

Relations of Commander-in-Chief to Secretary of State.

From what has been stated, it is clear that the relations of the General Commanding-in-Chief to the Secretary of State for War are those of subordinate to superior; otherwise, the principle of Ministerial responsibility could not be applied. For the Commander-in-Chief is not a member of the Cabinet, nor need he have a seat in either House of Parliament; and unless, therefore, he could be overruled by the Secretary of State, the acts of administration performed by him in the name of the Sovereign would be acts for which no Minister would be responsible, which is contrary to the settled principle and practice of the Constitution.

The relative position of the two officials is clearly shown in the Royal Warrant of 11th October, 1861, the last issued on the subject, wherein—after reciting it to be Her Majesty's pleasure that the military command and discipline of, the appointments to, and the promotions in the army, "together with all powers," &c., &c., vested now or hereafter in the Commander-in-Chief, should be excepted from the Department of the Secretary of State for War—it is expressly provided that such powers shall be exercised "subject to our general control over the government of the army, and *to the responsibility of the Secretary of State for the exercise of our Royal prerogative in that behalf.*"

The practical effect of the limitations is that the Commander-in-Chief has the initiative in certain acts of administration, while still leaving it necessary for him to obtain the sanction of the War Minister to the performance of these acts.

This principle, as was fully admitted by the Commander-in-Chief before the House of Commons' Committee on Military Organisation in 1860, is for instance invariably respected in the case of higher military and staff appoint-

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ments. The Commander-in-Chief informs the Secretary of State of the officers whom he proposes to nominate to such appointments, and these names have to be approved by the Secretary of State before being submitted to the Sovereign; while in the case of the very highest posts, the Chief Commander with an army in the field, &c., they are not only subject to the approval of the Secretary of State, but are in many instances decided by the Cabinet.

Office of Commander-in-Chief.

The office of Commander-in-Chief as a permanent institution dates from the year 1793. Prior to that year the Duke of Marlborough had been Commander-in-Chief in the reign of Queen Anne, but the appointment was temporary and was not continued. In fact the King, with his principal staff officers, the Adjutant-General and Quartermaster-General, exercised the command in person, and when unable to do so, as for particular services, military enterprises, or distant inspections, general or other officers were deputed for the particular service required.

Origin of Horse Guards.

In 1793 the office of General Commanding-in-Chief was established; Lord Amherst's being the first appointment to the post, and the Adjutant-General and Quartermaster-General being placed under his orders. Thus was formed the nucleus of the present Horse Guards establishment.

War Office.

War Office.

By the year 1856 the administration of the Army—which had prior to the Crimean War been vested in six Government Offices, more or less independent of each other, viz., the War Office, Horse Guards, Ordnance Office, Treasury, Colonial, and Home Offices—became concentrated in the War Office, under the Secretary of State for the War Department.

Heads of War Office.

As at present organised there is a Secretary of State, with a seat in the Cabinet, and usually a member of the Lower House; a Parliamentary Under Secretary of State, with a seat in the Upper House; and a Permanent Under Secretary of State—a permanent official, as the name implies, who carries on the traditions of the office.

Division of War Office.

Under these chief authorities the War Office is divided into three principal *Departments*. (1) Ordnance Department, under the Surveyor-General of the Ordnance, who may or may not have a seat in Parliament; (2) the Finance Department, under the Financial Secretary, with

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a seat in Parliament; and (3) the Military Department, under the General Commanding-in-Chief the Forces, Field-Marshal H.R.H. the Duke of Cambridge, K.G.

By the Order in Council of 4th June, 1870, their duties are defined as follows:—

The Surveyor-General of the Ordnance is charged with supply of all kinds (warlike stores as well as rations), transport, and quarters.

The Financial Secretary with Pay and Audit of Accounts.

The Officer Commanding-in-Chief with the recruiting, training, discipline, distribution, and command of the Army.

Staff with the Troops.

Staff with the Troops.

The foregoing principle of subdivision of duties obtains throughout the Army, the General Officers in command having under their orders a Staff with a like distribution of work. Thus there is in each command a Commissariat and Transport Staff, an Ordnance Store Department, a Paymaster, and a Military Staff.

Originated in 18th Century.

The Military Staff is a growth of comparatively recent times. It was only in the 18th century that it arose in the form we now find it, and from that time has acquired gradually more and more importance.

Necessity for a Staff.

The explanation is simple. Formerly, when campaigns were conducted with small armies and extended perhaps over years, when the cultivation of the soil was not carried on to the extent now the case, and roads were few and bad, when both the theory and practice of war were in their infancy, the commanders stood less in need of the assistance of a staff. It was easy for one man to control small forces; the slowness of the operations gave time for deliberation before a move on the military chess-board was made; and generally time was not of so much value in war. The backward condition of agriculture, the low state of the military art, the absence of means of communication and especially of railroads, simplified the conduct of the campaign, both as regards the troops before the enemy and the care of their lines of communication. There were not, neither could there be, those complex strategical and tactical combinations which, skilfully carried out, lead to decisive successes. Lastly, the infantile state of the military art—whether military history,

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statistics, geography, topography, or cartography—on the basis of which all operations are now grounded, set aside any necessity for careful preliminary study, and gave to the genius of the commander far more chances of success than is now the case. When war was thus, as it were, made in the dark by both sides, the balance of success, other conditions being equal, inclined to the side of genius. Now it is not so. Genius in these days, without a stratum of knowledge to back it, avails little. Wars are now conducted with such rapidity and with such large forces, that those nations which do not in time of peace apply themselves to the study of all possible theatres of war, do not scrutinise beforehand the military system and forces of their possible antagonists, do not keep a close watch on their neighbours' proceedings, do not keep pace with the times in the art of leading troops—those nations have no time to fill up the void of their military knowledge when the time comes to make use of it, and must inevitably succumb to a better-prepared antagonist.

Apparently the preceding remarks only prove that in the present day the higher commanders must have wider knowledge and training than of old. But well-versed chiefs are alone insufficient. The art of leading troops is now so complicated that there is no possibility of even the best-prepared commander being able to carry on the work single-handed.

Function of the Staff.

The function of the Staff is to render him assistance in carrying out the details of his command, and in conveying his orders to the troops, and to see that those orders are properly executed. The General, as his name indicates, applies his mind to general principles; while his Staff look after the details.

For the direction with skill of the movements of a large army, "the man who commands ought to have a hundred voices, a hundred eyes, a hundred ears. Those voices, eyes, and ears are the officers of his Staff."

Staff has to prepare for war in time of peace.

In these days of large armies and quick, rapid movements, very important duties fall upon the Staff, not only in the actual field, but in the preliminary arrangements for the campaign.

General duties of Staff in the field.

It is the Staff which prepares the plans for the mobilisation of the forces for war, and is concerned with their despatch to the frontier; on those troops taking the field

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the Staff carries out the details of the movements, guides the columns, reconnoitres in advance, gathers intelligence of the enemy, works out the details of the positions for encampments and bivouacs, and on the field of battle conveys the orders of the General, and sees that they are executed in accordance with his conceptions.

An efficient Staff, then, is part of the military organisation of a State. "A good Staff," says Jomini, "has the advantage of being more lasting than the genius of a single man; it preserves traditions; it is the best safeguard of an army. It is to the army what a skilful Minister is to the State. It seconds the chief when he is an able commander; it foresees and prevents failure when the general is unfitted to command."

A Staff has become a permanent institution in all Armies.

The acknowledgment of this principle has led all the European States to organise the Staff on a permanent basis, and to give it a uniformity of training; for the operations of large forces in the field can only be controlled by the General-in-Chief, when his dispositions and orders are interpreted and carried out by the other Generals and Staff on one uniform system.

Uniform training of Staff desirable.

This system of uniform training has been in vogue in Prussia since 1806–7, when it was introduced by Scharnhorst, after the misfortunes of those years; misfortunes which were within measurable distance of blotting out Prussia from the map of Europe. He subjected the whole Staff to one uniform education and training, the Staff of the troops coming up from time to time to Berlin to be attached to the Great General Staff, as it is called, and the members of the Great General Staff taking their turn with the troops. Such is the system still in force, the entire training of the Staff coming in this way under the supervision of the Chief of the General Staff of the Army, Field Marshal Count von Moltke. This system has been gradually copied by all the Great Powers.

But Staff service should alternate with Regimental duty.

Although the Staff is acknowledged as an essential and permanent part of the Army, it is not desirable that officers should be continuously on the Staff, otherwise they are apt to lose that community of feeling and interest for the troops which is so essential to the harmonious working of the Service.

The English Staff ought to be, and probably is, second to none. The experience gained in quarters and in the

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field in every corner of the globe, the constant interchange between staff and regimental service, the love of field sports, travel, and discovery in their widest sense inherent in the Anglo-Saxon race, all serve to make the British officer broad in his views, trustworthy in council, self-reliant, daring and active in execution.

The Staff of an Army in the Field.

Division of Staff in the field into

When an army quits the base of operations and takes the field the General-in-Chief is relieved of all responsibility for the supply of his army, and for the care and safety of his communications, by an officer of high rank called the General of Communications and Base, who, while undertaking these responsibilities, is in all respects subordinate to the General-in-Chief. By this arrangement the latter is relieved of an immensity of labour and detail, and is enabled to direct his attention solely to the beating of the enemy.

Staff of Field Force and Staff of Communications

Hence in all campaigns there is a division *ab initio* of the Staff into (1) Staff of the Field Force, (2) Staff of the Line of Communications. Both Staffs proceed together to the base of operations, but each have distinct duties and responsibilities, the latter Staff being subservient to the former.

It is, of course, advantageous that the Line of Communications Staff should reach the base of operations rather before the Field Force, in order to make preparations to receive the troops, improve the wharves and landing places, and prepare buildings or erect constructions for storing supplies; but this is not always possible, especially when the place of debarkation is in hostile territory, and thus it usually happens that the base is established after the commencement of hostilities, and not simultaneously with their opening—as, for instance, in Egypt in 1882.

Staff of Field Force.

Staff of the Field Force.—The tables issued with Army Circular 186, of 1877, give the detail of the Staff of an Army Corps; but as these tables are drawn up for a campaign in Europe, contemplating a Field Army of one or more Army Corps, they are subject to modification when a small force is despatched from these shores.

The table on page 9 gives the normal Staff for the different units for a campaign in Europe; but, practically, although the general principles are adhered to, the Staff

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for an expeditionary force is constituted for each campaign according to the nature of the enemy, the country, and so forth.

Staff in Egypt, 1882.

The Staff of the Expeditionary Force to Egypt was as follows :—1 General Officer Commanding, with 4 Aides de Camp; 1 Naval Aide de Camp, 1 Chief of Staff, with 2 Aides de Camp; 1 Deputy-Adjutant General, 1 Deputy-Adjutant General (Intelligence Department), 3 Assistant-Adjutant and Quartermaster Generals, 2 Deputy-Assistant-Adjutant and Quartermaster Generals, 1 Officer Commanding Royal Artillery (Brigadier General on Staff), 1 Aide de Camp, 1 Brigade Major, 1 Officer Commanding Royal Engineers (Brigadier General on Staff), 1 Aide de Camp, 1 Brigade Major, 1 Commandant at Head Quarters (Assistant-Adjutant General), 1 Provost Marshal (Assistant-Adjutant General), 1 Senior Commissariat Officer, 1 Senior Ordnance Store Officer, 1 Chief Paymaster, 1 Principal Medical Officer, 1 Sanitary Officer, 1 Principal Veterinary Surgeon, 1 Deputy Judge Advocate.

Each Infantry Division :—1 Lieutenant General, 2 Aides de Camp, 1 Assistant-Adjutant and Quartermaster General, 2 Deputy-Assistant-Adjutant Generals, 1 Officer Commanding Royal Artillery, 1 Adjutant Royal Artillery, 1 Officer Commanding Royal Engineers, 1 Adjutant Royal Engineers, 1 Senior Commissariat Officer, 1 Senior Ordnance Store Officer, 1 Principal Medical Officer.

Each Infantry Brigade :—1 Major General, 1 Aide de Camp, 1 Brigade Major.

Cavalry Division :—1 Major General, 1 Aide de Camp, 1 Assistant-Adjutant and Quartermaster General, 1 Deputy-Assistant-Adjutant General.

Cavalry Brigade :—1 Brigadier General, 1 Aide de Camp, 1 Brigade Major.

The Staff of the Line of Communications is given in Chapter III.

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Detail of the Staff of the Higher Units.

Unit.	General Officer.	General Staff.					Artillery Staff.			Engineer Staff.			Non-Combatant and Administrative Staff.								Horses.		Tentage.			
		Aides de Camp.	Deputy-Adjutant and Quartermaster General.	Assistant-Adjutant and Quartermaster General.	Deputy-Assistant-Adjutant and Quartermaster General.	Brigade-Major.	Officer Commanding.	Aide de Camp.	Brigade-Major or Adjutant.	Officer Commanding.	Aide de Camp.	Brigade-Major or Adjutant.	Commandant at Headquarters.	Commissariat and Transport.	Ordnance Store.	Medical.	Chaplain.	Veterinary Surgeon.	Provost Marshal.	Clerks.	Servants.	Private.	Public.	Miscellaneous.*	Offices.	Servants and Saddlery.	Officers.†
Cavalry Brigade ...	1	1	...	...	...	1	...	...	...	...	...	...	...	1‡	...	...	1	...	...	1	8	11	1	1	1	3	4
Infantry ,, ...	1	1	...	...	...	1	...	...	...	...	...	...	...	1‡	...	...	1	1§	...	1	10	13	1	1	1	3	3
Division	1	2	...	1	2	...	1	...	1	1	...	1	...	1	1	1	2	1	1	9	33	40	2	2	6	7	13
Army Corps ...	1	4	2	2	2	...	1	1	1	1	1	1	1	1	1	1	2	2	1	19	58	82	1	2	10	9	21

* Guard and clerks. † Including marquees. ‡ These Departmental officers have their servants, horses, and tentage provided elsewhere.
§ One Veterinary Surgeon for two brigades.

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Relations of a Staff Officer towards his Chief and other Officers.

Tact and temper important virtues for a Staff Officer.

The main virtues a Staff Officer should possess are tact and command of temper; if he has them not naturally, he must do his best to cultivate them. Abruptness or brusqueness are to be avoided. The most popular Staff Officers are those with a genial, considerate manner; if to that they add knowledge of their work, and are straight, just, and impartial in their dealings, they cannot fail to command respect, and the work required of others, whatever it may be, will be done cheerfully and well.

Staff Officer occupies a peculiar and delicate position. His relations towards his General.

The position of a Staff Officer in his relations with his Chief, his colleagues on the Staff, and with regimental officers is one of no little delicacy and difficulty, requiring the exercise of great tact in order that everything may work with smoothness and harmony, and to the advantage of the service.

It must be remembered that the Staff Officer has to be the judge of matters, and propose and carry out measures far above the powers to which his army rank entitles him. He has an insight into matters which would otherwise be kept from him, and is brought into relations with persons of higher rank quite different from those usually obtaining between a subordinate and those in authority. In these circumstances the temptation is strong upon him to assume the authority of his Chief, especially in measures proposed or worked out by himself, and to forget that he is only preparing or executing the orders of his commander.

These rocks he must carefully avoid. He must understand how to fulfil his position without laying himself open to the charge of bragging or bumptiousness. He must have tact, discretion, and a zeal for the service which is free from all false ambition.

The greater the confidence reposed in a Staff Officer by his General, and the greater his independence, the more careful must he be in all matters where impartiality and justice are required, and the more vigilant must he be against overstepping the measure of independence allowed him by his Chief.

Staff Officer should ever

The Staff Officer will find constant opportunity of

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anticipating his General's intentions, by preparatory arrangements, or of refreshing his Chief's memory, or of quietly settling trivial matters; thereby *helping* his Chief and enabling the latter to give his time to more important matters, and not waste his strength upon details. All this must, however, be done without his hand being apparent, without fuss or ostentation, and without pushing himself forward. Even in difficult matters the Staff Officer must not let his efforts or his diligence be seen; he must let it appear as if matters were arranging themselves. His General will not fail to see what is done, and will value his efforts the more. save the General.

In the same way his tact will tell him not to show to the world the confidence reposed in him, nor to boast of it. On the contrary, he must *feel* that all his work is *by order*.

In his relations with his colleagues he must be cordial and friendly, careful not to hurt their susceptibilities by interfering with their legitimate work, or in other ways, so that there may be no friction. Relations towards other Officers.

In his relation with Commanding Officers, he should always remember their rank and the respect due to it. In his position of Staff Officer, he may often recognise the incapacity of Commanding Officers, and may hear unfavourable opinions expressed of them by his General, yet his own bearing towards them must not be influenced in the least by the circumstance.

A Staff Officer may be asked by a Commanding Officer for advice, or as to the views and intentions of the General on this or that matter. This is naturally due to the fact that he is in close relations with his Chief, is in the way of hearing the views and intentions of the latter, and in matters of correspondence and arrangement of detail is allowed a certain independence. In his answer he should be candid, and at the same time modest, without being indiscreet. He must, as a rule, limit himself in his answers to the ordinary conduct of business, and not enter into matters *upon which the General alone* can give a competent decision. His opinions can only be those of an individual. Common sense alone would dictate a certain reserve in these matters, for were his opinion often contradicted by the subsequent facts, its value would be materially depreciated.

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With other officers he should neither pretend to be bursting with official secrets, nor need he speak unnecessarily on business matters. If he possesses tact, he will always know whether he can answer an officer's questions without being indiscreet or not. There are many subjects which can be learnt from a Staff Officer, before they are known through the routine channel; as, for instance, whether leave applied for has been forwarded, the probable date of an inspection, and so forth. There is no objection to communicating facts of that kind, which enable an officer to make his arrangements. Other questions of an inconvenient nature can be turned off in a friendly manner with the exercise of a little tact, and at the same time without choking off his friend.

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CHAPTER II.—OFFICE WORK.

The regulations with respect to the general distribution of work among the officers of the Adjutant General, Quartermaster General, and Military Secretary's branch of the Staff of a General Officer are given in Sections V and XXI of the Queen's Regulations.

To recapitulate them briefly :—To the *Adjutant General's* branch belong all questions connected with the enlistment, service, discharge, interior economy, training and discipline of the troops; in time of war it is further charged with the replacement of casualties in men, horses, and material, and notes all changes in the *ordre de bataille.* Duties of Adjutant General's branch.

Upon the *Quartermaster General's* branch devolve all questions connected with the housing and sheltering of the troops, sanitary questions, collection of intelligence, and the transport or movement of troops. Its special duties *in the field* are to regulate the order of march; to define the positions to be taken up by the troops; to direct the preparation of surveys; to conduct reconnaissances; to collect information as to the enemy and local resources; and to have a general direction over the railway, postal, signalling, and telegraph services. Duties of Quartermaster General's branch.

The *Military Secretary* is the confidential Staff Officer of the General. He keeps and registers the confidential correspondence of his Chief. Upon him devolve all questions with regard to finance, honours, and rewards, promotions, retirements, and staff appointments. He collects the material for the official despatches to the Secretary of State, for the official letters to Head Quarters, Horse Guards, for letters on subjects not coming under the Adjutant and Quartermaster-General's branch, and prepares the rough drafts thereof. He acts as a buffer between the General and placehunters, and does the preliminary skirmishing with those numerous persons, military and civilian, who suppose they have "claims." The Military Secretary cannot issue orders under his hand, but must submit them to the Adjutant-General for publication. Duties of Military Secretary's branch.

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The three Staff Officers amalgamated in one.

In some districts and stations abroad the work of all three branches is carried on by one Staff Officer, who may be an Assistant-Adjutant and Quartermaster-General or a Brigade Major, as the case may be.

In time of war a Chief of Staff and

In time of war a Chief of the Staff and a Deputy-Adjutant-General Intelligence Department are appointed to an army in the field. The Chief of the Staff exercises general superintendence over the office, and is the *ad latus* of the General in conducting the campaign, taking as much as possible of the detail work off the shoulders of the General, and leaving the latter free to give his mind to the greater operations of war, the strategy of the campaign, and the tactical employment of the troops on the battle field. He must have the full confidence of the General; otherwise his zeal will be checked, his duty become difficult, and the army will soon perceive that he is not a man identified with and cognisant of the views and intentions of the commander.

a Staff Officer for Intelligence, also

The Deputy-Adjutant-General (Intelligence Department) is the recipient of all information bearing on the force, position, and organisation of the enemy, as well as any changes in his *ordre de bataille*. All information collected by spies and any journals, despatches, &c., captured from the enemy, are examined by him. He questions all prisoners. The department under his orders supplements by reconnaissances in the theatre of war the information gathered by the Intelligence Department of the War Office, and the maps prepared by it in time of peace. Its function is also to complete the information as to the practicability of roads, to find out the resources of the occupied country in horses, supplies, industrial products, &c., which might be useful to the troops.

a Staff Officer to control Newspaper Press, and

To the Head Quarters in the field should also be appointed a Staff Officer of tact and knowledge to control the telegrams and letters of newspaper correspondents.

a Commandant at Head Quarters.

A Commandant at Head Quarters for the higher units is also appointed. He commands the escort, details the roster for Head Quarters' camp duties, and sees that the Head Quarters are always provided with provisions and forage. He looks after the general disposal of the baggage, and regulates the quartering, marches, and police of the Head Quarters.

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Correspondence.

Whatever the composition of the Staff of a General Officer may be, the Queen's Regulations, Section XXI, Correspondence and Returns, specify clearly the different heads of Departments at home, to whom correspondence on the various subjects connected with troops has to be addressed. General observations as to forwarding to superior authority.

It must be clearly understood, however, that the General Officer decides on the spot all questions connected with the troops within his competence, and refers those only to Head Quarters at home, which he has not the power to decide. Every Officer is bound to exercise the functions of his office and to accept its responsibilities, one of which is the risk of error and the consequent adverse comments of superior authority.

In forwarding correspondence on subjects which are *not* within their province to decide, General Officers must state their concurrence therein, or otherwise, and make such observations, based upon matters within their own knowledge, as would enable the superior authority to come to a right decision without a second reference.

On technical matters it is well to embody the professional opinion of the head of the Department concerned. For instance, in matters relating to defences, constructions, and lands, the opinion of the Commanding Royal Engineer; in sanitary matters, the opinion of the Principal Medical Officer; in questions affecting the provisioning, quartering, or transport, the opinion of the Commissary General. As regards munitions of war, the Commanding Royal Artillery and Commissary General of Ordnance should be consulted.

General Rules of Correspondence.

Correspondence is conducted by means of (1) letters of a formal type, or (2) the less formal and briefer memoranda, and minutes. Forms of correspondence.

Letters are invariably used:—From an inferior to a superior, *e.g.*, from a Regimental Commanding Officer to the Staff Officer for submission to the General; from the Brigadier to the Divisional Staff Officer, and so forth; in opening correspondence on some new and important subject, or in reviving an old subject. It is easier, moreover, for a subordinate to urge his views strongly in the form of Letters, when used.

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a letter, while maintaining due deference and respect towards his superior.

A letter would be written in the case of a General calling to account a subordinate, thereby investing the matter with more importance.

Custom and the usages of the service and discretion must dictate when memoranda and minutes can be employed.

Memoranda and minutes.

Memoranda are of two kinds—(1) Original Memoranda, from a Staff Officer acting under the authority of his Chief, as a substitute for the formal letter, and (2) remarks, explanations, or replies relative to correspondence in hand, or more properly speaking *minutes*.

Their employment.

Memoranda of the first kind are the chief means of communicating instructions or orders of a passing nature, when a formal letter is not deemed necessary, or when the matter is not of sufficient importance to encumber the order books. They are also used to convey information, call for information, correct misapprehensions, and so forth.

Pass memoranda.

When they affect several corps, and time does not press, the same copy may bear on its face the several addressees, one below the other, with the word "*pass*" above the uppermost, and "to be returned" after the lowermost. The various corps forward it to the next on the list, initialing and dating the memorandum before doing so, while the last on the list returns the memorandum to the office from which it originated.

Sometimes the memorandum is taken round by an Orderly, in which case it is enclosed in an envelope, the latter being left open and the addresses of the various recipients noted on the outside.

War Office minutes.

It is not essential that the Commanding Officer or his Staff Officer should sign his initials to the receipt; those of the Clerk will suffice, the only object of the signature being to fix the responsibility on one or other of the subordinates of the authority to whom it is addressed.

In large commands the telegraph is employed for the transmission of orders, memoranda, and the like.

Minutes are employed also at the War Office for communication between, or for circulating official letters or despatches among, the heads of Departments.

On a letter or despatch reaching the War Office, it is

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placed in a cover called a "Minute Paper," and on the outside of this Minute Paper is marked the registry number of the letter (in the War Office archives), the date of its receipt, and below are given the various heads of Departments to whom it is to be circulated in succession. Any remarks they may have to make on the contents are shown as minutes on the "Minute Paper;" while drafts of any letters written in pursuance of decisions given are enclosed in the minute paper, and the numbers and dates of the letters are noted on the outside cover or "jacket." When the paper has to be circulated with all possible speed it is enclosed in a green cover. After the paper has gone the rounds, it is put away in the registry.

When one Department of the War Office requires information from another Department, or has to address it on a subject which it is desirable to place on record, the minute is written on a Minute Paper, then sent to the Registry to have a number put to it, and afterwards sent to the addressee: thus it has become a permanent document in the War Office archives, and can always be traced. A minute is not always necessary, for much, of course, is arranged by verbal intercourse between heads of Departments.

Form of Letters.

Form of letters.

When the letter form is used, the paper (foolscap) should be folded with a quarter margin, the margin being on the inside, so that when the letter or despatch is placed in the guard-book or is bound up, as the case may be, no portion of the writing may be hidden.

In the upper corner (usually the left) should be shown the office of issue, the consecutive number the letter bears in the General Register, and if the letter is a confidential one it should be so marked. On the opposite upper corner (always the right) should be the place and date.

In the Queen's Regulations it is laid down that letters are to be headed "From the General Officer Commanding," "To the Adjutant General to the Forces;" but the War Office practice (like other public offices) is to put the name of the addressee at the bottom left-hand corner.

In the case of a long letter, it is much better that it should commence "From the General Officer Command-

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ing," "To the Adjutant General to the Forces, Horse Guards," and then the recipient sees at once from whom the letter comes, without having to turn over several pages to find the signature.

Addressing and signing letters.

With regard to the addressing and signing of letters generally, the subordinate addresses the Staff Officer and not the superior direct. The subordinate signs it, and not his Staff Officer. This holds good throughout the gradations of rank. On the other hand, letters, memoranda, &c., from a superior to a subordinate are signed by the Staff Officer "By order," and are addressed to the subordinate, not to his Staff Officer.

Signing in absence of General.

Letters to the War Office, to the Horse Guards, or to an Officer superior in rank, should be signed invariably by the General himself. In the event of the General being absent on leave or sick, &c., the Officer in temporary command will sign "In the absence of the General Officer Commanding." If the General is absent on duty, "For General Officer Commanding, absent on duty."

The Chief of the Staff is the only one who can sign "For the General Officer Commanding," and he then takes all responsibility for any action he may initiate.

Signing by Staff Officer.

When a Staff Officer signs a memorandum or order, he should precede his signature by the words "By order."* This is unnecessary in the case of a letter, as the opening paragraph specifies that it is by direction of higher authority.

Direct correspondence between Staff.

In direct correspondence between officers of equal rank and authority, when neither is under the orders of the other, *e.g.*, between Brigadiers, heads of Departments, &c., the one addresses the other and signs the correspondence himself. They may also employ their Staff in correspondence of a routine character, and, in these circumstances, the Staff Officer of the one addresses the Staff Officer of the other.

When it is necessary for a Staff Officer to obtain an opinion from the head of a Department on any matter, the following methods are adopted according to the circumstances of the case. If the head of Department is directly

* The meaning of "By order" is, that I convey to you these instructions *by order* of an authority you are bound to obey, and not simply that the writer is acting under the orders of his *own Chief*.

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under the Staff Officer's Chief, the Staff Officer writes the matter in memorandum form, with the following note:—

Forwarded to the Officer Commanding Royal Artillery (or Principal Medical Officer, &c.) for remarks. By order.

But if the head of Department is not under such command, but belongs to some superior Staff, and the opinion is desired on some matter which need not be formally referred through the superior staff, the Staff Officer would either go personally or write a semi-official note that "the General would be glad of his opinion on the subject he transmits."

Officers of Departmental Staff. Their correspondence.

Officers of the Commissariat and Transport Staff and Ordnance Store Department are allowed to sign letters of a routine character, not involving an expression of opinion, when addressed to superior authority, *e.g.*, the Surveyor General of the Ordnance, "By direction of the General Officer Commanding."

Enclosures.

If there are any enclosures in a letter, they should be mentioned in the text, and across the margin a line drawn surmounted by the number. If there are several, a schedule of enclosures is sometimes forwarded.

Return of documents.

If a document, either from its being wanted for record or for return elsewhere, is required back from a subordinate, a note should be made "To be returned;" or, in the case of a letter to a superior, the return should be asked for in the text. In the event of nothing being said with regard to the return, the retention or return of the document will rest with the recipient.

Receipt and Registry of Letters. Conduct of Business with the Chief.

Central Registry at War Office.

At the War Office there is a regular branch for the first reception of letters addressed to the Under Secretary of State, where they are all opened and registered before distribution to the Departments concerned. Those addressed directly to Departments in the War Office are of course opened by the particular Department, and are then sent for entry in the W. O. Register.

Same principle in Staff offices.

In the same way, in all Staff offices, the letters should be registered with an office number and the date of their receipt.

Letters ad-

As a rule the letters addressed to the General are

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Addressed to General. How dealt with.

opened by the General himself, who pencils in the margin the Departments to which they have to be circulated, and gives them to his Military Secretary to distribute. The ordinary routine letters require no special attention from the General; but with regard to others upon which the General desires further information, or upon which he reserves his decision, it is the custom to write "Speak" in the margin, or to write the gist of the answer to be returned.

Letters to Staff Officers direct are opened by those to whom they are severally addressed.

The various Staff Officers on receiving their letters, or those addressed to the General which refer to their branch, proceed to deal with the different subjects, drafting a memorandum for subordinate Commanders, looking up former correspondence, preparing drafts for replies, and so forth.

The ordinary correspondence that can be disposed of, except as to signature, by the Staff Officer, is laid before the General at his usual hour of business, the Staff Officer giving in a few words the contents; but in the case of more important letters, all references likely to be asked for by the General should be at hand, and if necessary and if a technical matter the Staff Officer should have discussed the subject beforehand with the head of the Department concerned, so that the matter may be ripe for receiving the General's instructions thereanent.*

The question as to whether a Staff Officer should express his views to his General will be dependent upon the relations between them and on the General himself. Some Generals, before coming to a decision, prefer to have another opinion; others prefer to form their own. But much will depend on the degree of confidence of the General in the knowledge, trustworthiness, and discretion of the Staff Officer. If the latter is asked for an opinion, let him give it modestly but decidedly, and, if necessary, adduce the grounds on which that opinion is based.

* In some of the headquarter offices in India, a schedule of the documents upon which the chief's decision has to be obtained is submitted to him together with the documents. In this schedule are shown the office number and nature of the documents and the remarks of the Staff Officer concerned. The chief records his decision on each subject in a column set apart for the purpose.

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Should the General give a decision, which, in the opinion of the Staff Officer, is contrary to the regulations, let him draw with *great* deference his Chief's attention to it. If, however, the General holds to his decision, either because he reads the regulations in another sense, or does not appreciate their exact application, any further remonstrance of the Staff Officer would be wrong and out of place. The Staff Officer is simply an executive officer of his Chief, and it lies entirely in the discretion of the latter to what extent he will listen to and accept the Staff Officer's opinion.

In any case the decision must be framed in the sense intended by the General, whether the Staff Officer agrees or not.

When the General has given his decision on the various papers, they are passed to the clerks for the fair copies to be written, when this is not done by the Staff Officer himself, and for registry. After being duly signed, they are transmitted to the persons concerned. Any letter of a confidential nature would be written by the Staff Officer himself, and a copy entered in a "Confidential Book" kept for that purpose under lock and key.

Books for Registry of Correspondence, &c.

Rule as to property of documents.

Documents received in a Staff Office become as a rule the property of that office. If, however, those documents have merely to be transmitted to a higher office, or come from a higher office marked "To be returned," they will belong to that higher office. It will be for the Staff Officer to judge if it is necessary to keep copies of documents merely passing through his hands.

The General Register.

In any case, whether letters are received, sent, or passing through, a record of the fact and the proceedings consequent thereon are made in a book called the *General Register*.

This is a War Office book of foolscap size, No. 193.

The following is a common form of the entries in the case of an Assistant Adjutant-General's Office of a District, and applies generally, with modification, to all Offices.

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Register No.	Date of Letter.	From whom.	Horse Guards or War Office No.	Enclosures.	Subject.	How Disposed of.	On what Date.
	1882.						
1995	23rd Feb.	O.C., 3rd Dragoon Guards.	... ...	1	Leave application. Captain Smith, from 27th Feb. to 27th April, 1882.	Sanctioned. Passed to O.C. Regt. and filed in $\frac{J}{126}$.	
1996	22nd Feb.	D.A.G., R.A. ...	R.A. / N. District / W. 53942	1	Joining. Of Captain Brown, T Battery, 1st Brigade; for duty.	Noted by Brigade and filed in $\frac{K}{21}$.	
1997	20th Feb.	O.C., 2nd Batt. Essex Regiment.	... ...	1	Appointment. As Brigade-Major, Shorncliffe. Application by Captain Robinson for.	Submitted to Military Secretary.	23rd Feb., '82.
1998	22nd Feb.	O.C., 1st Batt. Highland L. I.	... ...	1	Discharge. Of Private Alfred Jones as an incorrigible and worthless character recommended.	Submitted to A.G., H.G., and recommended.	25th Feb., '82.
1999	24th Feb.	Sub-Inspector, Army Schools.	... ...	1	Schools. Report on Ordnance Store Corps. Schoolmistress engaged in needlework during hours prescribed for instruction of infants.	O.C. Corps for Report. Filed with Report in $\frac{K}{142}$.	
2000	20th Feb.	Adjt. General ...	19 / N. District / 143	...	Discharge. Documents 2191 Private Thos. Corrigan, 2nd R. Irish Fusiliers. This man's next-of-kin should be shown on his military history sheet, for the information of the Commissioners of Chelsea Hospital, *vide* G.O. $\frac{38}{1881}$.	1. Completed and returned, (signed) E. Matthews, Lt.-Col. 2 S. and A. Highrs., 22.2.82. 2. N. District, 24.2.82. Forwarded by the Lt.-Gen. Comg.	
2001	25th Feb.	General	... ...	4	Messes. With reference to Horse Guards letter (see Register No. 1884), General forwards reports on Officers' Messes and Expenses.	To A.G. Copied $\frac{P.B.}{\frac{14}{970}}$ Copy appended to 1884.	25th Feb., '82.

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If the document registered is a letter emanating from the office, it is so entered in the *Third Column*, and in the column "How disposed of" is entered the number of the guard-book in which it has been put away after its return, or the volume containing the copy, if not ordered "To be returned."

The *Sixth Column* ("Subject or Purport") can be extended so as to contain a very full extract of the contents if requisite. If it is probable that the papers will pass through the office more than once, sufficient room must be left in the "How disposed of" column to admit of a record of the various stages of the correspondence.

When papers are simply to be transmitted, it is not usual to keep copies unless they are of *importance* and are to be sent out of the command. The copy would be written in the book kept for the purpose, and the remarks in the Register would show the book and page where copied. When no copy is kept, the entry in the Register would always enable the correspondence to be traced and called for if necessary.

All letters of the regular formal type emanating from the office itself, whether to superior or inferior, are copied in full, their entry in the Register being made in the usual manner.

Circular memoranda (or pass memoranda), after return from the persons concerned, are usually kept in a guard-book.

With regard to confidential communications, the entry would be made in the Register as usual, just sufficient information being given under the column "Subject" for the document to be recognised, and no more.

The *Register*, then, gives a complete epitome of all the transactions of the office, and should be very carefully kept. It is the most important book in the office.

In permanent offices in garrisons the letters not sent by the post are taken round by orderlies. Each orderly should have a memorandum-book, in which are entered all letters entrusted to him, with the *Register* number of the letter and the address of the recipient. There is a blank column for the recipient to place his initials and the time of receipt of the letter.

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Letters, Orders, and Instructions.

Principles of drafting letters, &c.

In all correspondence, but especially in letters expressing views or opinions, relating circumstances, &c., the style should be concise, logical, and clear, avoiding long periods, while the contents should be arranged according to the sequence of events, each new idea in a fresh and numbered paragraph. The essence of the matter should be at once entered upon without lengthy introduction; exaggerated expression should be avoided, the point strictly borne in mind, and only the interests of the service kept in view.

Orders and instructions.

In drawing up orders, instructions, &c., every word and every sentence should be weighed—not a syllable too much or too little. The individual drafting the order should be careful not to exceed his powers, or demand things which are contrary to the arrangements of higher authorities, or the execution of which is questionable. Further, the sphere of responsibility of subordinate authorities should not be unnecessarily infringed by arrangements and orders which might and should properly emanate from them. Such interference operates disadvantageously by weakening the authority of those subordinates, and depriving them of their independence.

At the beginning of each order, the motive for it should be briefly stated, without lapsing into prolixity and without adopting a tone which might look like a justification of the order. The order should be so clear and intelligible that there can be no doubt with regard to it, while the special mode of carrying it out is left to the subordinate to whom it is addressed.

Orders conveying blame and censure.

An order conveying blame and censure should never be sent until the subject-matter has been thoroughly sifted. If complaints are made against a subordinate authority, let the judgment be reserved in the first instance, and call upon the subordinate authority for a report, the complaint or irregularity being communicated to him as it stands and without addition. When the answer is received, an unbiassed judgment can be formed; whereas by a premature decision, which has to be afterwards modified or reversed, authority is materially weakened.

In cases where there are faults or omissions in correspondence, it is usually sufficient to return it for correction,

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pointing out the regulations which apply to the case. But when mistakes occur frequently with the same office, leading to the belief that there is carelessness in the matter, and the General Officer considers it desirable to administer a rebuke, the latter should be drawn up in calm, temperate language. It will be usually sufficient to point out the irregularities, and require that more care be observed in the correspondence for the future.

If there is more than one commanding officer implicated in these irregularities, it will be well to embody the rebuke in a general order. In this case the commanding officers, who were the cause of the order, should not be named; such a course would serve no good purpose; the rebuke will be sufficiently keenly felt from the circumstance of their omissions being made public.

Incorrect views should be set right, not blamed. The refutation must be free from any personal allusion, and should deal only with the essence of the matter. That blind obedience which is required of the soldier is not necessary from commanding officers, who should be *convinced* by putting forward a more correct view of the matter in point than their own. Their free expression of opinion should be encouraged, without however allowing any controversy.

When a serious rebuke is necessary it is usually written by the General Officer himself, or else dictated by him to the Staff Officer. In this the reprimand may be much softened by the way in which it is written without being weakened. It must be remembered that written words enter more deeply than those that are spoken, especially if censure is conveyed; as such are never written without consideration or in the heat of the moment. The reprimand must be earnest and dignified, without animus or bitterness; but must be the outcome of pure zeal for the service, soldierly discipline, and the honour of the cloth.

In correspondence with higher authorities, the tone should be neither cringing nor presumptuous, but straightforward and modest.

The preceding considerations apply generally to the conduct of business by Staff Officers. In developing the subject further it will be convenient to consider the remaining duties—(1) under the ordinary conditions of peace, (2) at manœuvres, (3) in time of war.

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1. Office Work in Time of Peace.*

Adjutant-General's Branch.

Duties of Adjutant-General's Branch. Equipment and clothing.

Among the responsibilities which devolve upon the Adjutant-General's branch, several subjects are included with which in practice he is very little troubled. Thus, under the head of general efficiency is included the proper equipment and clothing of the troops—arms, accoutrements, clothing, and necessaries. In ordinary circumstances, however, all routine matters relating to the equipment of the troops are managed by direct correspondence between Officers Commanding Regiments and the Ordnance Store Office. It is only when exceptional circumstances arise—demands for equipment in excess of prescribed scale, objections to articles on account of quality, pattern, &c., or when differences arise with respect to the issue—that the superior military authority on the spot is required to take any steps in the matter.

When the point at issue is referred to the General Officer Commanding, the latter either decides the matter on his own judgment, or assembles a Court of Inquiry to investigate the matter. He then either takes his decision or refers the matter to superior authority—in this case the Director of Artillery and Stores. For Regulations as to Boards, see Equipment Regulations, 1881. R.A.R. Vol. III.

In a similar manner, all correspondence relating to demands for clothing—requisitions, size-rolls, &c.—passes direct from Officers Commanding Regiments to the Director of Clothing, Pimlico, who acts under the instructions of the Surveyor-General of the Ordnance. The articles are supplied direct from the clothing stores on the scales prescribed by regulation,† but any reports, complaints, and so forth are made by the Commanding Officer, through the Adjutant-General of the District, and if these cannot be dealt with on the spot, the General Officer Commanding refers them to the Director of Clothing. In the event of any delay in the supply, General Officers

* See Queen's Regulations, Section XXI, Correspondence and Returns.

† The Clothing Regulations, 1881. R.A.R., Vol. XI.

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Commanding will report the circumstance to the Adjutant-General to the Forces.

Annual reports on clothing made by Officers Commanding Regiments, &c., are sent to the Adjutant-General of the District, and are forwarded to the Adjutant-General, Horse Guards, with the remarks of the General Officer Commanding upon them. Regulations for assembling Boards of Survey are given in the Clothing Regulations, p. 102. Annual reports on clothing.

Correspondence with reference to the formation of the annual gymnastic class for officers, on the 1st January, at Aldershot, and the half-yearly class for Non-Commissioned Officers on 1st January and 1st July, now passes direct between General Officers Commanding and the Inspector of Gymnasia. The correspondence is done by the Adjutant-General of the District, while the route to proceed is issued by the Quartermaster-General of the District. Gymnastic Classes.

Correspondence with regard to castings of horses falls to the Adjutant-General of the District, the General Officer Commanding having to concur, the final approval resting with the Adjutant-General to the Forces. *See* Queen's Regulations, Section XI., and regulations relating to allowances, Army Regulations, Vol. I., Part III., Section XIX. Castings of horses.

General Officers Commanding make all arrangements for the training of the Militia and Yeomanry within their districts, applying at the end of each year to the Secretary of State as to the periods during which the training is to take place in the ensuing year. Training of Militia, &c.

The transfer of men to the 1st Class of the Army Reserve on the termination of their first period with the colours is carried out by Commanding Officers, but the transfer of men to serve with elder brothers, transfer of Non-commissioned Officers to permanent staff of Auxiliary Forces, transfer between Permanent Staff of different corps, are all arranged by General Officers Commanding in accordance with Queen's Regulations, Section XIX. Transfers of men.

Courts-Martial.—Applications for Court-Martial are prepared on Army Form B, 116, by the prisoner's Commanding Officer, and submitted to the District Adjutant-General. The form of application requires to be filled up with the description of Court applied for, the name and corps of prisoner, the place of trial, and the general character of the prisoner. With the application is for- Courts-Martial.

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warded the charge-sheet in duplicate (one copy to president, one filed with application), the summary of evidence (sent to president), a medical certificate, the prisoner's defaulter sheet, list of witnesses for prosecution and defence, and a statement showing by whom the prisoner's character and particulars of service are to be proved. (Army Form B, 296.) The last three are returned to the Commanding Officer with the notice of trial.

The District Adjutant-General examines these documents and submits them to the General, who usually initials at the foot of the charge. The Staff Officer then issues the necessary order convening the Court, and writes on the Charge Sheet, "To be tried by District Court-Martial (or General Court-Martial*), and signs it "By Order." This, with the summary of evidence, is sent to the President of the Court, and is his authority for trying the man on the specific charge or charges.

Proceedings of General and District Courts-Martial.

Proceedings when complete are forwarded, except in the case of a General Court-Martial at home, to the General Officer having power to confirm the finding and sentence of that particular Court, and are then examined and laid before the General by the Staff Officer with such remarks as he may think proper to submit.

If the Court is to reassemble for revision, an order must be issued to that effect.

If confirmed, extracts are made into a book kept for that purpose. The proceedings go to the Regiment for promulgation, and are afterwards returned to the Adjutant-General of the District for the information of the General Officer Commanding, who sends them to the Judge Advocate General.

Proceedings of Regimental Courts-Martial.

Regimental Courts-Martial come under the General's notice at the next annual inspection.

General Officers Commanding are held responsible that Court-Martial Returns are carefully examined, and any irregularities brought to the notice of the Commander-in-Chief.

Boards.

Boards for examination of Officers and Medical Boards upon officers abroad, are applied for to the District Adjutant-General.

Confidential reports.

Confidential Reports of Inspection.—The forms are two in number: (1) relates to a regiment generally, its efficiency, discipline, conduct, equipment, training, &c., sent to the

* If his Chief has the power to convene General Courts-Martial.

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Adjutant General; (2) a detailed report on each officer separately, his services, qualifications, and efficiency, sent to the Military Secretary. The opinion of the Commanding Officer is recorded separately, and when practicable is written in the General's presence.

Returns.—The Returns required to be furnished by Regiments and General Officers Commanding are detailed in the Queen's Regulations, Section XXI. Returns.

Regimental District Commanding Officers correspond through General Officers Commanding, addressing the proper Staff Officer. They render monthly returns to the District Adjutant General, with a copy to the Adjutant General to the Forces, of all troops in their district, the number of recruits enlisted, and their disposal. Conduct of business by Officer Commanding Regimental District.

Each Militia regiment renders a separate monthly return to the Adjutant-General of the District.

Beyond the statement of numbers of recruits enlisted and their disposal, the Officers Commanding Regimental Districts correspond on recruiting questions direct with the Inspector General of Recruiting in London.

Officers Commanding Regimental Districts, after consultation with Militia Commanding Officers, submit to General Officers Commanding dates and places for the training of each battalion.

Annual Inspections of Infantry Auxiliary Forces are made by Officers Commanding Regimental Districts, but if sent to a large tactical station the General Officer there in command arranges specially for their inspection. Similar arrangements are made for the inspection of Cavalry and Artillery Auxiliary forces, by Lieutenant-Colonels of Cavalry Districts and of Artillery Sub-Districts, who correspond with the District Adjutant-General. Inspection of Auxiliary Forces.

Quartermaster-General's Branch.

In time of peace the Quartermaster-General's branch is principally occupied in carrying out the various duties connected with the moving and quartering of troops; and secondly at some stations with the collection of intelligence. Duties of Quartermaster General's Branch.

Movements of troops are performed under authority of a document called a *Route*, conveying the delegated power of Her Majesty for the movement, signified through the Secretary of State of War. A *Route* is absolutely neces- Movements.

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sary in the United Kingdom, no matter what the strength of the party may be, in order to legalise the drawing of billets, requisitioning carriages, and so forth. The payment to a railway or steamboat company is usually effected by means of a *passage warrant:* a voucher enabling the company to recover the money afterwards.

This *Route* can be issued by the District Quartermaster General when the party is not travelling beyond the limits of the General Officer's command; if beyond, application must be made to the Horse Guards, or, if in Ireland, to Dublin. There are certain exceptions to this general rule, which are specially provided for by regulation.

In ordinary circumstances the *Route* must be obtained before the move can take place, but in urgent circumstances not admitting of delay the movement can be ordered, and a *covering route* applied for afterwards.

Barracks. With regard to quartering troops in barracks, the District Quartermaster-General determines the barracks each corps will occupy, but the charge of barracks and their interior appropriation are commissariat duties.

Canteens. Regimental canteens accounts are sent quarterly to the District Quartermaster-General, who audits them, sees that the canteen regulations are complied with, and forwards them to the Horse Guards.

Army signalling and cooking. Correspondence with reference to the army signalling classes and cooking classes,* formed at Aldershot, constitutes part of the work of the District Quartermaster-General.

Intelligence. The collection of intelligence with regard to the local resources, roads, and so forth, of the country round or in the vicinity of certain stations abroad, and a study of its topographical features, with a view to possible utilisation in the event of war, form an important branch of the duties of the Quartermaster-General's Department. The material for a comprehensive report should be carefully collected and collated, and a copy sent to the Intelligence Branch at the Horse Guards, through the Quartermaster-General.

Staff Work at Manœuvres.

When autumn manœuvres are held in this country, Staff Officers have sometimes to accompany their Generals to take part in them.

* Each Regiment must have a trained Sergeant Cook.

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District for manœuvres.

The district in which the manœuvres are to be held is usually determined beforehand by the War Office, and in order to facilitate adjustments with landowners and farmers with respect to damage to crops, a local commission of influential landowners is appointed for the settlement of claims.

The ground having been selected, and the troops transported to the spot, arrangements for a mimic campaign have to be considered, with as much approximation to what would happen in real warfare as is possible.

To this end the drawing up of the "general idea," *i.e.*, the strategical supposition which underlies the operations of the day or days, requires careful consideration.

The General Idea and the Special Ideas.

"General" and "special ideas."

Briefly the "general idea" indicates the general military situation of the two opposed commanders, and is binding for both. It may indicate the strategical situation of the opposed detachments for several days, but the nature of the ground and other circumstances may make it necessary for some other idea to regulate the subsequent manœuvres. The military situation may be most conveniently changed at any time by unexpected reports (supposed) of events occurring beyond the battle-field, *e.g.*, approach of a hostile detachment from an unexpected direction. But in any case the "general idea" should only communicate to each commander *what is evident to him from the general military situation, and what he would know in war, or could learn from the means at his disposal.* It may prescribe the defensive for one of the commanders, or cause both sides to take the offensive.

General idea.

Hence in drawing up the general idea we should aim at clearness and simplicity. It consists of two parts.

First, the general military situation should be intelligibly given in a few words. It is not necessary that we should suppose the operations of large armies. A mixed brigade, for instance, may be supposed to be the advanced guard or the flanking detachment of a division or army corps operating singly.

Secondly, the "general idea" gives the general tasks of the two commanders. Although these should be indicated with precision, they should not necessitate a definite mode of solution, but should give latitude for a variety of com-

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binations. The points must be indicated from which the operations commence, and must be so selected that the opposing sides *do not fail to come into collision.* For instance, if one side has to occupy any given point or to destroy a certain section of railway, and the other side has to prevent this if possible, it would be manifestly incorrect to select the point of departure of the one detachment at a day's march from the point, and the point of departure for the other at two days' march.

Having then fixed upon the "general idea," we come next to the "special ideas," quite distinct in character.

Special ideas.

The "*special ideas*" define the *special circumstances* which guide the operations of *each* of the contending parties, and indicate the immediate object to be attained. They are given out for one day only, and from the situation at the close of the day a new departure can be taken, if necessary.

The special ideas for the manœuvres of subsequent days can in general be prepared beforehand, but should only be finally determined and issued the day before the execution.

Hence the special idea for one side should not refer to that for the other side. They should not be in the form of orders, and care must be taken that the respective tasks set are not capable of being carried out in an unexpected (and yet perfectly correct) manner, defeating the intended course of the manœuvres.

The simple circumstances of actual war should serve as the guide. At the commencement there should be brief intelligence of the enemy, and then the tasks.

Simplicity and clearness in the drawing up are in this case also the chief points to be attended to; the tasks must not contain too many details, which would trammel the free resolution of the commanders, and render the situation an artificial one, and must be of such a character as to guide the commander's decision in the desired direction, without limiting him to a single mode of solution.

It is by no means necessary that the special ideas should bring the two sides into *direct* collision. On the contrary, suppositions which lead to flank collisions are often most instructive, and show the ability of the commander to deploy rapidly from column of route for battle towards a

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flank, and also test his arrangements for discovering the enemy's position.

As regards the distribution of the troops, it is generally desirable to make the two sides of unequal strength, giving the preponderance to that side which from the general plan of the manœuvres has to gain ground to the front. The particular arm with which it should be reinforced will depend chiefly on the ground. Distribution of Troops.

Should it be necessary for reasons connected with manœuvring ground or for convenience of camps that the direction of the operations be materially changed, this can be effected, with semblance of reality, by causing new information to be introduced in the special ideas.

In the special ideas are indicated the troops at the disposal of the commander for the execution of his task, and the place and hour of their rendezvous and departures, respectively. If these arrangements are left to the commander himself, it is possible that no collision will take place.

Duties of Staff Officers with the General Officer Superintending the Manœuvres.

Let us suppose that the troops have reached the manœuvre ground. and have been divided into two bodies placed at some distance apart. On the day prior to the commencement of the manœuvres a state of war is declared, and the two forces place outposts in proper form. The Head Quarters of the Superintending General would be fixed at some intermediate point between the two forces, and thence he would inspect, or cause to be inspected, the outposts. The position of the outposts would then be corrected if necessary. Preliminary duties at manœuvres.

For the next day's work the Staff Officer will take the General's instructions on the following points:—

1. The distinguishing signs of the respective contending forces: whether helmets and forage caps, or one side with branches on the helmets, Lancers with furled or unfurled flags.
2. The commanders of the forces for the day.
3. Clothing and equipment of the troops.
4. Number of rounds for infantry and artillery.
5. List of umpires for the day.

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6. Appointment of rendezvous for the respective forces (to be communicated separately).

7. Arrangement for an orderly officer, trumpeter, and mounted orderlies for the General Officer superintending, and hour and places where they have to report themselves.

8. Giving out the general idea to both sides, and the special ideas (sealed) to each side separately. With the special ideas are also sometimes given in a sealed letter the troops to furnish the outposts at the end of the day, and the place and hour of their rendezvous.

9. Arrangements as to the hour at which the orders of each commander have to be sent in to the General. This should usually be the evening before, so that the General may have an opportunity of changing the orders in the event of these not being likely to lead to a collision.

Duties of Staff of Superintending General.

The Superintending General, in his functions as umpire in chief, is assisted by his staff and by a senior umpire and assistant umpires appointed for each of the contending forces.

The attitude of the General and of the umpires would be simply observant, and they should not hamper the commanders by their immediate presence. Instructions or advice to commanders are out of place, as such would not be forthcoming in war. Irregularities, for the same reason, would be left uncorrected, and reserved for the *critique* at the end. Strong or hasty judgments, or expressions of opinion as to the behaviour of the commanders, are also wrong.

Every phase of the proceeding should be closely scanned by one or other of the umpires, who should be able at any time to make a report, and give an opinion to the General. In the event of a commander making important changes in his proceedings, he should be questioned as to the causes which led to these changes, and be required to give copies of the reports upon which they were based.

The critique.

The *critique* at the end of the day, in presence of the senior officers, should be short and to the point. The commanders should read their respective tasks, and then state their course of action, and any orders or reports they may have received during the day. This is done so that the officers present may understand the scope of the proceedings.

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After Commanding Officers have explained their operations fully, and given any information required by the umpires, these latter retire to consider their decision on the day's proceedings. The decision arrived at, together with the grounds upon which it is based, is communicated by the senior umpires to the Superintending General, who then reviews the proceedings and adds to, or modifies, the opinion of the umpires as he may think proper.

Duties of Staff Officers with Officers commanding one of the opposing forces.

If the Staff Officer's Chief has a command, the former must watch the manœuvres attentively, and understand the object of everything that is done, so as to be able to grasp the sense of any order he may have to convey. A nod of the head and a few words must often suffice to indicate to the Staff Officer the person to whom the order is to be taken, and its purport. It will also be his province to assist in drawing up the orders. These orders would differ according as to whether they are for a simple march, or for the attack or defence of a position.

Drawing up orders.

The orders drawn up by each commander for the next day's proceedings will be based on the general and special idea; the reports of his own patrols and his own observations made within the limits of his outposts. They should be short and to the point, and set forth the following points: (1) place and date of issue; (2) position of enemy; (3) intention; (4) point of assembly; (5) time of assembly; (6) time of departure; (7) order of march; (8) direction of march; (9) position of commander. In the defence, time of occupying the position.

Details, such as despatch of patrols, detachments, &c., mode of attack, distribution of troops in a position, defensive works, position of reserves, &c., would be added according to circumstances.

With regard to orders in general, Count von Moltke has written as follows:—

Count von Moltke on orders.

The order should contain all (but only so much) that the subordinate cannot independently determine. It will give the result of the intelligence that has been received—the general situation—so far as is necessary to enable the subordinate to judge correctly the purport of the task entrusted to him. All reasons for the orders—all political reasonings, all general suppositions—are out of place. Very rarely

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should the intentions of the commander be made known, as unforeseen circumstances may change the condition of things in a few hours. The commander will always be present when the decisive blow has to be struck, and will then and there carry into execution what is practicable.

On the other hand, the order states briefly and precisely what the units, divisions, &c.—the advanced guard, flanking detachments, as the case may be—have to do; whether to remain still or to move off, and, if so, in what direction.

In this, also, as little should be prescribed as possible. There might be reasons, unknown at head quarters, which would render it desirable for one corps to move off at 5 o'clock, the other at 6; or for one to march in three instead of two columns; or for it to march through this instead of through that village. If the corps are close together and a collision with the enemy is expected, or if we are advancing to fight, it will be, of course, necessary to specify definitely for each unit the place and hour of departure, the number of columns and their directions of march, the hour of repast, the place and hour of arrival, the position of the main body, the conduct of the advanced guard, and so forth. At the same time, a certain freedom must always be allowed the units. Being constituted to act more or less independently, they should be able to carry out the intentions of the commander-in-chief according to their own judgment, as the circumstances can never be foreseen. It is quite sufficient to say, "The division will reconnoitre the ground on the right flank." It would be wrong to add that this is to be done by one officer and 20 men. In the event of failure, the commander of the detachment would maintain that he would have employed 40 men, had he not been bound by his orders.

In some circumstances the order may regulate the movements for more than one day in advance; at times it is impossible to do so for even one day. Change in an order after issue is sometimes unavoidable, but none the less an evil. Though theoretically so easy to change the direction of movement of a corps, it is not so in practice, when the strength of the troops has been taxed to the utmost by marching, when detachments have been sent away, reinforcements are on the road, supplies arranged, transport detached, and most probably an action to be broken off. In a forward movement no mention of a retreat should be made. A retreat must be preceded by a defeat, and in such cases we can very seldom determine beforehand the direction in which it will be possible to retire. It will depend partly on the enemy, and consequently should be ordered verbally, according to the force of circumstances.

Every order must indicate the place to which the commander will transfer his head quarters; and, under certain circumstances, where he is to be found during the march or during the engagement.

Lastly, the hour of issue must be shown, so that a judgment can be formed under what circumstances the order was framed—circumstances which, by some important event or other, may have undergone an essential change since that hour.

With regard to the forms to be observed, it should be mentioned that the order should be addressed to the commander and not to the detachment, as in the field the influence of the individual quickly

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takes the place of the abstract title of the office; and lastly, with a view to saving time, that the order be issued simultaneously to all the commanders.

It is important that each commander should know what orders the others have received. He then sees what roads are appointed for his neighbour's march, and consequently debarred to his own. He can also estimate where the other detachments, &c., will be at a certain hour, and so forth. Special communications for the separate detachments may be added at the end, or be separately sent.

The style of the order should be simple and definite. No expressions are to be used, such as "leaving it for consideration whether to attempt," or "where possible," or the like. What is ordered must be carried out; but, at the same time, nothing should be ordered which is not practicable. For instance, wide-sweeping movements of weak isolated detachments through extensive woods upon the rear of the enemy, and such like.

Many orders sent in give a detail which should be left to the individual who is charged with carrying it out, and who is responsible for doing so. If the individual to whom the conduct of the manœuvres is entrusted looks at the matter from the right point of view, his order will, from what has been said, be concise, and only include what is necessary—the execution being always left, as far as possible, to the individual on the spot.

For the purpose of seeing that the order is complete, let the issuer place himself in the position of the recipient. Nothing that is necessary for the recipient to know should be omitted; on the other hand, all details should be omitted which cramp the free action of the subordinate.

One of the essential qualities of a general is to ensure the execution of his orders by the clear manner in which they are given. The drafting of orders is a very important matter; insight, character, capacity all show themselves there.—JOMINI.

An order is short when it does not contain one word too much; complete, when there is not a syllable wanting; clear, when it can be comprehended at once by the meanest intellect; precise, when it answers the questions—from whom? to whom? when? and where?—VON HARDEGG.

Orders. Principles as to drawing up.

Every order should have at the commencement or in the margin the order of march or order of fighting (*ordre de bataille*) corresponding to the object to be attained.

With regard to orders for the march, the object, strength, and composition of advanced guards, &c., the order of march, &c. *See* "Marches."

With regard to orders for *fighting*, they will vary according as to whether the offensive is to be taken against the enemy, or whether the matter in hand is the defence of a position.

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In the former case the following points should be clearly brought out:—

Orders for the offensive.

1. Intelligence as regards the enemy. Object of the engagement, and the general circumstances under which it takes place, taking care not to go into details.

2. Duty of the advanced guard: its time of departure and direction of march (special orders are given to the commander of the advanced guard, often verbally).

3. Time of departure of the main body, and order of march; the roads to be taken, place and hour of halt. At what hour certain points must be passed.

4. Strength and composition of each column, if newly formed.

5. Object which each column should have in view.

6. Time of departure of each column, or the rendezvous with time of arrival there.

7. Time of the attack.

8. Position of the commander (usually with the advanced guard) and of the reserves.

9. Orders for the ammunition columns, baggage, and trains (not at manœuvres). Line of retreat and places of assembly thereon are, if given at all, given *verbally*.

Little should be prescribed as to the fight itself, for "Nothing happens so often as the unforeseen." It would be entirely out of place to prescribe in the orders what should be done under a variety of different circumstances.

Orders for the defensive.

For a defensive position:—

1. Intelligence of the enemy; general intention and circumstances.

2. Site of the position.

3. General distribution of the troops upon the position according to the *ordre de bataille* (the commanders of the tactical units fix the details).

4. Duty of the advanced guard, if any, and of the outposts, whence the enemy may be expected, and how and where he is to be met.

5. Patrols and detachments.

6. Arrangements for strengthening the position.

7. Position of the commander.

8. Arrangements for the ammunition columns, baggage and trains, places for the bearer companies and field hospitals (in the field).

Verbally. Line of retreat and places of assembly.

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Umpires and Staff Officers employed as such should carefully watch the tactical situation at the time of the troops coming into collision, as it is an important part of their duty to give a decision upon it, either at the time or in the subsequent report to the Superintending Officer. Umpires. Their duties.

Their decision should be based on a full consideration of all the following points: (1) *the number of the opposed troops*, bearing in mind that too much stress must not be laid on superiority of numbers, as there are many instances in military history when a small number of men have beaten off a far superior force; (2) *the moral impression* which would be produced by like circumstances in war, *e.g.*, moral effect of a sudden appearance of troops, and an immediate attack with the bayonet before the enemy recovered from his surprise, &c.; (3) *the formation* at the time of collision, whether it was one suited to the circumstances or not; to judge of this it will be frequently necessary for an umpire to dismount from his horse to see if the attacking party is covered during its advance by a fold of the ground; (4) *the effect of the different arms*, *e.g.*, a battery, the flanks of which are protected by infantry, can hold out against the enemy's fire until but two men remain to serve the gun; a squadron, on the other hand, which remains halted within a few hundred yards of infantry, should be put out of action, and its commander reported to the General; while cavalry cannot attack infantry in good order and prepared for them; (5) *the advantages and disadvantages of the ground* for attack and defence. Here the ground should be noted as affecting the action of the different arms, the nature of the buildings, woods, &c.

The decision must be based on tactical grounds alone.

Staff Work in the Field.

Framing Orders in the Field.

The remarks made in the preceding pages with reference to the framing of orders for manœuvres apply generally to the preparation of orders in the field, with this difference, that clearness and precision are of still more importance in time of war. Orders in the field.

Further, the carrying out of military operations with the precision and certainty necessary to success depends

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to a great extent upon the orders reaching the commanders concerned at the right moment.

Simple though these requirements may appear in theory, in practice it is very different. The uncertainty as to the enemy's situation, the bustle, and the strain of active operations are antagonistic to precision in orders, while their opportune arrival at destination may be prevented by such common occurrences as an orderly missing the road or falling into the enemy's hands.

Nevertheless, as the enemy will be at equal disadvantage in these respects, and as "the successful General is the one who makes the fewest mistakes," we must do the best that the circumstances admit. To this end we must aim at (1) obtaining accurate knowledge of the enemy's proceedings, concealing at the same time our own, and (2) method in the distribution of orders.

It has been well said that "knowledge of the enemy's proceedings forms the basis of all plans and movements in war." By this it is not meant that we should make our action dependent on that of the antagonist, or limit ourselves to parrying his blows, but that we should use the knowledge gained in order to lay down the law to the enemy and fight him in positions of our own selection.

Orders must be based on knowledge of enemy's proceedings.

(1) *Knowledge of the Enemy's Proceedings.*—In order to understand an enemy's proceedings, and infer therefrom his intentions, it is the duty of the Staff to study in peace his organisation, order of battle, and his system generally of conducting war. With this knowledge, as a basis, the Staff is enabled to estimate at their proper value the information obtained during active operations from the local population, spies, newspapers, or the telegraph. But such information, although it may throw light on the general situation, will rarely suffice as the groundwork of our proceedings. It must be supplemented by observation on the spot. This is the work of the cavalry, which, by the rapidity of its movements, anticipates events. Its function is to discover the enemy's marching columns, his camp, his outposts, and to keep them in view; to capture orderlies, seize the post and the telegraph books, and tap the telegraph wires. The intelligence shown by the cavalry in drawing the proper inferences from what it sees, and in the reports it sends to the rear, is the criterion of its efficiency.

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If the enemy's cavalry is doing its work well, a reconnaissance in force may be necessary in order to find out his strength and position. This reconnaissance in force should oblige the enemy to show his hand, and after the resulting fight we can ascertain from the prisoners and from the numbers on the coats of the dead, the regiments and corps which have taken part, and thence often infer the nature of the hostile force in the neighbourhood. Whilst the fight is proceeding, well-mounted Staff Officers should endeavour, by making a detour round the flanks, to penetrate the enemy's veil and observe the heart of his positions.

From all these sources information is obtained, upon which an idea is formed of the enemy's situation.

The difficulty is to estimate the reports at their true value. It is from a mass of false, confused, and uncertain information that the small kernel of truth has to be discovered. Good reporting is as difficult as the drawing up of good orders. Accuracy is the main point.

To report that no enemy has been met with is just as necessary as to report his presence. The certainty of the commander is increased from the circumstance that this negative information supplements the positive. The cavalry should also report what it learns from hearsay, distinguishing such information from what it actually sees.

As a rule it is well that the cavalry should have some definite task, whether it be to discover the position of a hostile camp, to find out whether a certain village or villages are occupied, whether the enemy's troops have reached a certain line, whether troops are moving by a certain railway or road, and so forth. A definite task will induce clear reports.

In order to see much, and at the same time to veil the movements of their own army, the cavalry should spread over a wide front, but the veil should not be so thin as to admit of the enemy penetrating. There must be large supporting bodies of cavalry in rear to prevent this.

While we are endeavouring to find out all we can about the enemy, he will be endeavouring to do the same with regard to us. The result will be that the opposed cavalry will come into collision. Success will lie with that one which is superior and paralyses the action of the other.

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Our own proceedings must be concealed.

As further means to concealing our proceedings from the enemy, we must remove all unauthorised persons from the vicinity of the troops, punish all spies with the utmost rigour, and, above all, keep our plans secret. The intentions of the commander should not be made generally known until the moment arises for their being put into execution. To this end, when important movements are impending, no Staff Officer should know more than is necessary for the due performance of his special duties, and the little he knows should not be read in his face by the ever-present newspaper correspondent, be he ever so wily.

Method in the distribution of orders important.

(2.) *Method in the Distribution of Orders.*—Method in the distribution of orders is of great importance, A fixed hour each day should be appointed by the Commander-in-Chief for the issue of orders, and the subordinate general officers will endeavour, as far as possible, to have a fixed hour for the issue of their orders. It must be remembered that orders have to pass through many hands before they reach the units lowest in the scale: battalions, squadrons, and batteries. These latter should, if possible, receive their orders at the latest before night has far advanced.

Any want of regularity in the hours appointed by the highest authority is reproduced with the authorities of lower degree, and may lead to recriminations against the chiefs, and be prejudicial to discipline.

Orders and instructions.

The arrangements of a commander for a given operation of war may be communicated to the troops as (1) orders: army orders, army corps orders, divisional orders, brigade orders, &c., &c., or (2) instructions.

Instructions.

Instructions are those communications issued by superior authority to the commander of a body of troops detached upon some independent operation, when such superior authority is likely to be too distant to exercise control, and the commander so charged will be thrown on his resources for some days. Instructions therefore differ from orders in not being so detailed or so binding; they contain rather leading ideas for the guidance of the subordinate in forming independent resolutions. They set forth the views and wishes of the superior authority, but leave the execution to the subordinate.

Instructions are applicable to the following cases: an army corps detached from an army, or a division detached

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from an army corps, upon some independent operation, such as the protection of the flank of an advancing army or army corps against hostile enterprise, or in pursuit of a beaten enemy, or when separated from the army or army corps by a more or less impassable obstacle. Again the advanced guard of an army, or the Cavalry Divisions in front of an army, would in many cases be provided only with instructions, the situation not being clear enough to admit of the more definite order.

Orders. Orders are, on the other hand, more decided and detailed, being based on some definite knowledge of the enemy's circumstances. But even an order must not be regarded as a law which cannot be broken. On the contrary, it ceases to be binding as soon as the circumstances in which it was framed have ceased to exist. A subordinate must be always ready to assume the responsibility of taking an independent resolution when the circumstances change.

Hence an order should, as a rule, only contain *what* is required to be done; the *how* (when no co-operation with others is required), must be left to the individual entrusted with the execution. It should be clear, precise, and definite, and should leave no doubt as to what is required to be done in the circumstances in which it was written.

Sphere of responsibility not to be infringed. Each commander gives orders only to those units immediately under him, and avoids all reference to the components of those units.

For instance, the Commander of an Army Corps as a rule gives orders to his Divisions, to the Corps Artillery, Corps Engineers, Cavalry Brigade, Corps Ammunition Columns, and trains. To detachments, advanced guards, and so forth, only when such detachments, &c., were specially arranged by him; for example: the composition and formation of the advanced guard and flanking detachments when the army corps is moving by one road.

In the same way the Divisional Commander would give orders to his Infantry Brigades, his regiment of Divisional Cavalry, Divisional Artillery, the Engineer Company, Bearer Company, Baggage, Divisional Ammunition Column, and to any special units he may form, *e.g.*, advanced guards, flanking detachments, &c.

If a unit has to be broken up for detachment purposes,

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the selection must be left, as a rule, to the commander of the unit, and the strength only specified when it is considered absolutely necessary. For instance, the Corps Commander, after indicating what is known about the enemy and the object in view, should say, "The 1st Division will despatch a detachment to Alton, for the purpose of carrying out the following duty," *not* "The 1st Division will despatch the 1st Infantry Brigade, with the 1st Squadron 2nd Dragoons, and K—2 Royal Artillery to Alton." The Divisional Commander must, as far as possible, be left free to arrange the detachment as he may consider best, select the commander, and so forth.

Orders become longer as the commanders from whom they emanate descend in the scale of command. Thus the commander of an army of several army corps issues orders disposing for the day of the several army corps, the directions of their march, and their destinations. The orders of the army corps commanders are more detailed, as they deal with a variety of units, whose order of march varies with the circumstances.

Sometimes the orders only set the troops in movement, and leave all else to be ordered on the spot. For instance, with a Division or smaller body of troops, where the situation is not clear, the commander being present on the spot, with the troops under his eyes, can deal with each incident as it arises.

Issue of orders.

Orders should, as a rule, be issued daily, and, if possible, at a fixed hour.* If the troops are all together, as in a bivouac, and the force small, the orders may be dictated verbally; but if the troops are widely scattered, written orders are necessary. In fact it may be laid down as a principle that, for a large body of troops, the written order is necessary as a security against misunderstanding.

No one (officer or clerk) should be present at the

* In the Peninsula the following arrangements obtained:—On *halting days* the Assistant-Adjutant Generals attended at Adjutant General's office for orders at 10 A.M.; the Brigade Majors attended at the Assistant-Adjutant General's office at 11.30, and at 1 P.M. the Brigade Majors issued the orders to Adjutants of regiments. On *marching days* the Assistant-Adjutant Generals attended for orders as soon as the troops reached the new ground. If late, orders requiring immediate execution were issued at once; those of general regulation were deferred till next day.

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issue of orders but those authorised to receive them. When the Staff Officers are assembled and have made their reports, the Chief of the Staff, or whoever the senior Staff Officer may be, gives out the orders for the day. It is desirable before this is done that watches be compared and set by that of the Chief of the Staff. The omission of this precaution has led more than once to failure in the execution of an order.

When the orders are dictated, it is necessary that one of the copies be read over aloud to see that no error has crept in. Each Staff Officer should have with him his map, so as to be able to verify the position of important places.

Every order should be prefaced by the place of issue, date, and hour of despatch, and should invariably be signed.

*Orders and Reports in Action.**—Orders, telegraphic or otherwise, dispatched to bodies of troops before the enemy, should always be numbered in sequence, and bear the exact time of despatch, so as to give a clue to the circumstances in which they were issued. Orders during an action.

An order sent to a body of troops, ordering them to take part in any action or other operation, should be sent in duplicate, or even triplicate, by different routes in order to ensure one copy reaching its destination.

The order to attack the Austrians at Königgrätz was sent by the King of Prussia at midnight on 2nd July, 1866, from Gitschin to Königinhof (the head quarters of the Crown Prince) in duplicate; one copy by an aide-de-camp along the direct road, the other by the detour through Kamenitz.

Many instances might be cited of operations being seriously compromised by the non-arrival of orders at their destination, when conveyed by a single messenger. For instance, the inaction of Vandamme's corps, on the 15th June, 1815, owing to an accident happening to the single Staff Officer sent with the order.

It is often necessary to see that an important order sent to a body of troops is really carried out, according to the intentions of the General. A Staff Officer should therefore be sent for the purpose of reporting that it has

* The W. O. "Field Message Book" is intended for this purpose.

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been done, otherwise troops, absorbed in what is going on immediately in their front, are apt to forget it.

Communication of Orders in the Field.

Orders in the field are conveyed by Staff Officers in important cases, but usually by aides-de-camp, orderly officers, or orderlies. Orders are also sent by telegraph, by signal, or by telephone.

Staff Officers bearing important orders are sometimes sent in pairs, and sometimes with a small escort, especially at night. They should invariably know the contents of the order in case of losing it, or having to make away with it. When the message is not of sufficient importance to send by the hand of an officer, mounted orderlies may be employed for short distances.

Orders should always be written with an indelible pencil, and enclosed in some form of envelope as a protection against wet and friction in the pocket.

Horse-posts. In the Franco-German War reports and orders were sent by *post-relays*, particularly in the case of the Cavalry Division reconnoitring in advance. Reports from the Staff Officer with the division were transmitted to the rear by horse posts (post-relays) regularly established for the purpose, and quite independent of the reconnoitring troops. They were also used for conveying orders and messages from one body of troops to another; for instance, for conveying the reports of a Staff Officer detached by his General to accompany temporarily the movements of an independent army corps. The post-relays consisted of cavalry posts of a Non-commissioned Officer and 3 to 9 men, placed at distances of 3 to 7 miles apart, and with an Officer to superintend every 14 miles. One man, with his horse saddled and bridled, was always held in readiness to start with a message, and the pace he had to go was indicated by one, two, or three crosses on the envelope. One cross indicated half-walk half-trot, or 1 mile in 9 minutes. Two crosses—a trot, or 1 mile in 6 minutes. Three crosses as fast as possible.

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Heliograph and Telegraph.

The heliograph was first used for war purposes in the Lushai expedition (1871–72). Subsequently, its advantages being so manifest, it was used with great success in Afghanistan and in South Africa.

Signals can be flashed to a distance of 40 miles and upwards. The rate at which signals can be read may be taken at five words a minute for a longish message on service.

Equipment of heliograph detachments.

It is very desirable that signallers should be mounted when on the line of march upon stout ponies or mules, so as to arrive at their destination fresh for climbing hills and for their work. Further, they should in some cases be provided with equipment, cooking utensils, rations and transport, so as to be independent for days together. They should be armed, and in dangerous localities provided with an escort.

Night signallers should have with them rockets or blue lights to attract attention. All signallers should have watches.

Rules as to messages.

Signallers should not leave their posts for the delivery of messages, however important. Orderlies must be specially told off for this duty. All messages to be sent from a signalling station must be written and signed, and must in no case be disclosed to any unauthorised person.

The following regulations were issued in Afghanistan for the guidance of telegraph clerks and heliograph parties:—

1. Field telegrams are never to be used when post or heliogram will do as well.
2. No message, unless of greatest importance, is to be sent after 6 p.m. Any such message to be countersigned by Commanding Officer of station or a Staff Officer.
3. Any message over 100 words and all cipher messages to be countersigned.
4. All press messages to be countersigned.
5. Press telegrams to be presented for counter signature at station of origin.

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6. All officers countersigning are responsible that messages are condensed.

7. No telegraphist or heliographer is to receive for transmission any message detailing movements of troops or affording any information regarding the force, unless countersigned.

8. State messages are to take precedence of private ones. By *precedence* messages are understood service messages of General Officers Commanding, of Commanding Officers of Posts and Staff Officers, of heads of Political, Engineer, Ordnance, Medical, Commissariat and Transport Departments.

The Commander-in-Chief and Chief Political Officer have also power to clear the line.

Signallers in charge of telegraph stations may send for the Commanding Officer's decision any message which they think might equally well go by heliograph.

Cipher Messages.

Cipher messages are much used in the field.

For communications between the General and the authorities at home a figure code is used. As this code is arbitrary in its arrangement, a message cannot be deciphered except by a person having the key. Unprincipled persons have been known to obtain and sell copies to those who will bribe them sufficiently, and therefore it is found desirable to change the code from time to time. Hence the English Government has some 18 or 20 distinct codes.

The Army and Navy Signal Book is a small portable code cipher of this class for communication between the sister services.

Staff Officers, however, require at times a mode of communication independent of any book; for instance, when proceeding on some service during which they are liable to be captured by the enemy.

On these occasions the cipher recommended in Lord Wolseley's pocket book is easily remembered, and requires no compromising paper to be carried. A square is divided

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into 25 parts by ruling vertical and horizontal lines. A keyword of 5 or 6 letters, none of which recur, is chosen, and such word is written in the first 5 or 6 squares, the rest of the alphabet following in order except J, and except those in the keyword, thus:—Suppose BANGOR to be the keyword agreed upon between a Staff Officer detached on a mission and the Chief of the Staff. Construct the table, and until familiar with the method, insert the figures as shown. It will be observed that every square bears the same number as the one directly opposite to it.

B 1	A 2	N 3	G 4	O 5
R 8	C 9	D 10	E 11	F 6
H 7	I J 12	K 0	L 12	M 7
P 6	Q 11	S 10	T 9	U 8
V 5	W 4	X 3	Y 2	Z 1

To send a message, "Enemy advancing." Writing the opposite squares of *q* for *e*, *x* for *n*, &c., the cipher message will run as follows:—*qxqha ysoyxtlxw*, which for economy in telegraphing we may break up into groups of five, *qxqha ysoyx tlxw*. To decipher, pursue the converse of the preceding. Cipher not trustworthy.

To make the cipher more difficult, agree with the correspondent to take the letters in groups of two, and bear in mind the following rules. When the pairs make a diagonal, they will be represented in cipher by the opposite letters of the diagonals. If the pairs are in the same vertical line, they are represented in cipher by those standing next below, the bottom letter by the top one. When in the same horizontal line, they are represented by those next on the right, the extreme right by the extreme

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left. If a pair consists of the same letter repeated, introduce a letter such as *x* or *z*, which will not deceive the receiver, and then divide into pairs in the usual way. This is known as Playfair's Cipher, and is a very good one.

Thus, for the message "Enemy advancing," or whatever it may be, divide it into groups of two letters as follows :—

en em ya dv an ci ng, and then in cipher the message will run—

dg fl wg rx ng iq go,

or for telegraphing rearrange in groups *dgflw grxng iqgo*.

After ciphering or deciphering care should be taken to burn the paper used, otherwise the clue might easily fall into unauthorised hands.

Office work in the field.

Office Work and Correspondence in the Field.—When troops are moving about from place to place, and are changing their quarters or bivouacs every night, office work and correspondence generally are limited to what is absolutely necessary, and little is expected except from the Staff of the higher units, who are, in consequence, usually located in quarters. From the Staff of the minor units only the most urgent documents should be required. The returns demanded from these units should be confined to expenditure of ammunition, pay lists, states, returns of sick and casualties, reports of engagements, &c.

Reports after an action, while everything is fresh in the memory, are important, as these are the documents from which the history of the war is written. Hence the commander of every regiment, corps, or detachment should furnish to his immediate superior an account of the part taken by his troops in the action as soon as possible after its termination. These hurried reports may be supplemented afterwards by later and more carefully-written reports, if thought necessary.

Form of field state used in Egypt, 1882.

The Field states sent in by the Indian Contingent of the Egyptian Expeditionary Force were on the following form, and were furnished twice a week by regiments and corps :—

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On One-quarter Sheet Foolscap.

Field State.

_____Regiment or Battery.

Place _____ Date_____

Distribution.	Officers and Men.					Horses.			Mules.		Followers.		Remarks.
	Officers.	Native Officers.	British Non-Commissioned Officers, Rank and File.	Native Non-Commissioned Officers, Rank and File.	Total, all Ranks.	Officers' Chargers.	Troop Horses.	Ponies.	Ordnance.	Transport.	Public.	Private.	
Present, effective ... Sick, absent, or otherwise employed (see over) .													
Total strength ...													

(On Reverse Side.)

Explanation of absent or otherwise employed.

Distribution.		Officers.	Non-Commissioned Officers and Men.	Horses.		
Sick ...	At _____					
	In Hospital					
	In Camp or Quarters ...					
	Total					

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CHAPTER III.—LINE OF COMMUNICATIONS.

Definition.

An army in the field is dependent for its existence on a continuous forward flow from the base of supplies of food and munitions of war. The road or roads or whatever may be the means found most convenient (rail, rivers, canals, &c.) for the transmission of the supplies is called the line of communications.

Railway advantageous.

For carrying power it is of course a great advantage to have a railway. In Egypt supplies were at first sent up by canal; but before the day of Tel-el-Kebir the railway had a daily carrying power of 200 tons, while by canal only 75 tons, and by the mules only 15 tons could be conveyed.

Transport of sick.

Transport by canal or river is the best for sick and wounded, as there is less motion.

The line must be organised and protected.

It is plain that as the army in the field is dependent for its existence on the uninterruptedness of the supply, such line of communications must not only have a suitable administration to secure this, but must also be protected against hostile incursions.

The idea of a line of communications is not of modern origin, but is to be traced back to the era of the invention of gunpowder. Prior to the general introduction of this propelling agent for war purposes in the middle ages, armies lived exclusively at the expense of the theatre of war, and knew no lines of communication; but the invention of fire arms demanded the transport of warlike stores, and thence arose the necessity for an assured communication with the mother country.

The transition about the same period from armies of knights to mercenary troops led also to a regular organisation of their food supplies. These hired soldiers were too costly to the State to leave their supply to the mere chance of finding food in the theatre of war.

Hence from two causes grew the system of organising the supply of the material wants of an army by transport from the rear—in other words, a base of operations and lines of communication.

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This system of maintaining and protecting the line of communications continued, with such modifications as were due to the peculiar methods of conducting war at different epochs, up to the present century, and still form the groundwork of the systems now in vogue with the armies of the present day.

General Principles of Organisation.

The regulations which govern the organisation of the line of communications in our Service are "The Regulations for the Organisation of the Line of Communications of an Army in the Field" issued with Army Circular dated 1st June, 1878, and "Regulations for the Supply of Stores to an Army in the Field," issued with Army Circular 1st November, 1881.

These regulations are drawn up for a small army of one or two army corps operating in a country provided with roads and railways, such as Western Europe. When operations have to be carried out in a wild country with a smaller force, the usual conditions under which a British force is employed, these regulations, although not requiring any change in principle, will require modification in the details.

Necessity for this service.

In the majority of the wars in which we are engaged, we cannot count upon finding supplies suited to our use in the theatre of war itself. All these must be collected at the base beforehand. The means of transport available in the theatre of war itself may be nil. Hence sufficient transport must be prepared beforehand, and maintained by constant renewals and accessions from time to time, as the field force recedes from its base into the interior. The line of operations may pass through a country where the population is hostile, and where the ordinary means of repression practised in civilised countries would be useless; it requires under these circumstances to be well guarded. The drafts of men, horses, &c., proceeding from base to front, and the convoys of sick and wounded returning from front to base, will require preparations for their reception at stages at ordinary march intervals, and possibly escorts for their due safety.

The General of Communications.

All these multifarious requirements cannot evidently be looked after by the General Officer commanding the

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troops in the field, but must be committed to the charge of an experienced officer, subordinate to the General-in-Chief and his Chief of Staff, called the General of Communications and Base, with a sufficient staff of officers and clerks for his assistance.

His duties.

The duties of this officer include the following:—

(*a*) The maintenance, defence, and police of the roads used as lines of communication and sometimes the civil administration of the occupied districts.

(*b*) The railway service.

(*c*) The commissariat and transport department on the line of communications.

(*d*) The ordnance store department on the line of communications.

(*e*) The medical department on the line of communications.

(*f*) The semi-permanent line of telegraph.

(*g*) The field post.

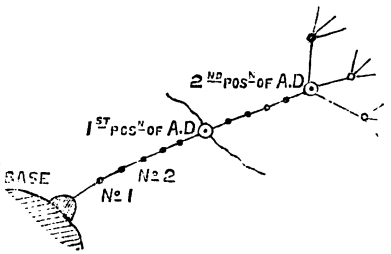
(*h*) The veterinary and remount depôts.

Each of these departments is administered by an officer who will be responsible under the General of Communications for carrying out all the duties of his branch.

All troops employed on the line for its defence and other duties, and all troops of the field force while marching along it, are under his orders.

Extent of his charge.

The charge of the General Officer of Communications and Base extends from the base of operations to the advanced depôt inclusive. If in the course of the operations



the advanced depôt is shifted forward, his charge is shifted forward to that extent, and any intermediate stages that may be formed come under his orders. Some-

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times when the operations become extensive it may be necessary to form an intermediate base.

For instance, in the later operations of the Duke of Wellington in Spain, Lisbon was the base of operations up to the time of the capture of Ciudad Rodrigo and Badajoz. These places became his advanced base for subsequent operations towards Salamanca and Madrid. In the advance on Vittoria, first Salamanca and afterwards Santander became new advanced bases. After the fall of St. Sebastian that fortress became the base for operations in French territory.

In proportion as Wellington advanced, the protection of his line of operations was taken over by the civil authority of the country. Only that part of the line immediately in his rear had a military organisation.

The General of Communications and Base and his Staff.

The "Regulations for the Organisation of the Line of Communications," prescribe the Staff for a large force of one or more Army Corps in Europe, but this list is subject to modification according to the force and the country in which operations are to be undertaken.

In Egypt the Staff of the Line of Communications consisted of the following:—1 General Officer (Earle), 1 Aide-de-Camp, 1 Colonel on Staff for Base (Lanyon), 1 Orderly Officer, 1 Assistant-Adjutant and Quartermaster-General, 4 Deputy-Assistant-Adjutant and Quartermaster-Generals, and 1 Commissariat Officer. Staff of Line of Communications in Egypt, 1882.

This was the Staff at the outset. It would have been augmented had the operations become more extensive.

Distribution of Command.

For convenience, the command of the General of Communications is divided into three distinct parts: Subdivision of command.

(*a*) The base of operations.
(*b*) The road or roads.
(*c*) The advanced depôt.

His Head Quarters will be at the base of operations, or at

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some point on the line of communications, or at the advanced depôt, as may be found most desirable.

The Base of Operations.

The base.

The circumstances of our wars may require our operations to be conducted from a maritime base, or from a land base—some point on the land frontiers of India or the Colonies. Both cases are similar in the general arrangements, and to describe the procedure in the one case will cover all that is necessary in the other. We will take here the case of a maritime base, as being the more comprehensive and difficult in respect of arrangements.

Organisation of base.

Organisation of the Base.—A maritime base of operations may be in our hands already, as in the case of Cape Coast Castle for Ashantee, and Durban for the Zulu War and Transvaal Operations, in which event much may be organised and many preparations made before the arrival of the expeditionary force; or the base may be in the enemy's hands, as Ismailia, for the campaign in Egypt, when nothing can be done beforehand.

At Ismailia the pressure to get the troops and stores landed was immense. The transports, 113 in number, were anchored* in Lake Timsah, on a front of a little more than a mile and a depth of three-quarters of a mile, and there were only three small miserable piers available for landing men and material. The Royal Engineers improved them, and laid down sidings to the railway station.

The General Officer in charge of the Communications and Base landed at Ismailia on the 21st August, selected the buildings as storehouses, hospital, and so forth, and on the 22nd the troops commenced to disembark under the superintendence of the Commandant of the Base, assisted by his Staff.

The troops, as a rule, have to be landed first, in order to push detachments rapidly to the front and secure a strong position on shore for the protection of the base. After the requisite number of troops have been landed,

* The anchoring arrangements are entirely in the hands of the Royal Navy, after consulting the Military authorities as to the order in which the troops and stores are to be landed.

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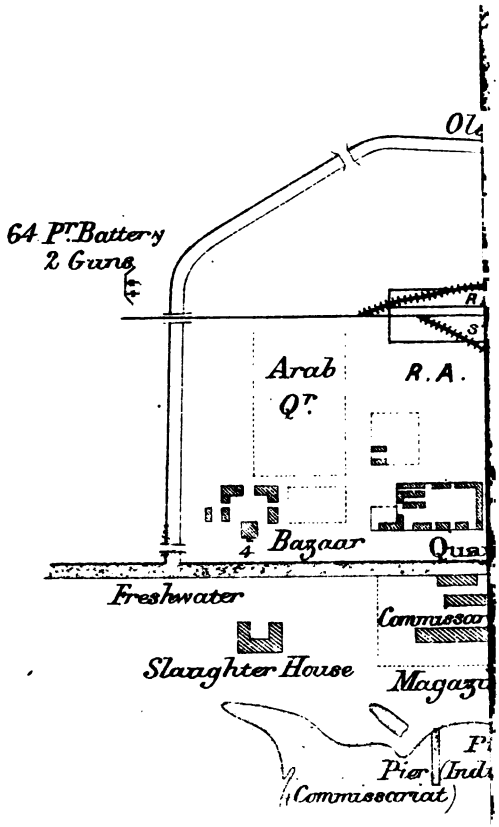

L

REFERENCE

1. Telegraph Station
2. Post Office
3. Cathedral
4. Mosque
5. Govt Offices
6. Canal Offices
7. De Lessep's Hou
8. Locks
9. 9. Ordnance Sto
10. 11. Landing Stag

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the rest of the troops and the stores can be landed concurrently.

In order that the troops may not suffer any privation on first landing, they usually land with a certain proportion of rations. Thus at Ismailia they disembarked with 3 days' rations of everything except meat and 2 days' meat (preserved). Among the first supplies landed were 60,000 rations, while each infantry transport carried 14 days' shore provisions, which were disembarked immediately after the troops.

After the first rush of troops on shore has taken place and the base is secured, the rest of the troops and stores can be landed with as much order and regularity as the circumstances permit. It is apparent that to empty every transport simultaneously would only cause embarrassment by accumulating a large quantity of stores which it might not be possible to remove.

Division of duties of Army and Navy.

The Navy provide the requisite boats, barges, lighters, and steam pinnaces, disembark from ship and convey all men, horses and material to high-water mark, or to the wharves and piers constructed by the Army. The unloading at high-water mark, wharves, &c., is performed by the Army. On an embarkation from the base, the boats, barges, and so forth, are loaded by the Army at the wharves, under the supervision of the Navy, who are responsible that the boats are properly stowed. The duty of trans-shipment to the transports also falls to the Navy. While holding to this division of duties, it should be remarked that the two sister services are to render each other mutual help in every way.

Naval Transport Officer.

When therefore a Naval Transport Officer accompanies a force, the military authorities have nothing to do with the disembarkation of either troops or stores. But as no troops or stores should be landed by the Naval Officer until a requisition from the military authorities has been received, it is very desirable that there should be close personal communication between the two services, and the Naval Transport Officer should live on shore.

Proceedings of General of Communications prior to troops landing.

On the first landing of the General Officer of Communications and Base, his first attention would be directed to selecting suitable buildings for hospital, stores, magazines, and so forth, and in the event of there being no such buildings he would indicate sites for erecting sheds

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or for placing the stores in the open under tarpaulins. He would then appropriate the different piers, wharves, and other landing-places to the troops and army departments, assigning, if possible, separate places to each, in the event of the expeditionary force being a large one. He would then cause to be opened up the necessary free communication between the various wharves and storehouses, and between the landing-places and various parts of the town, so that there may be no obstruction to the traffic.

These preliminary steps being arranged, he would provide for the construction of additional wharfage if necessary, and appoint, in conjunction with the Commandant of the Base, the different buildings for departmental offices, post, telegraph offices, and so forth. Further, he would select a site for the encampment of the troops a few miles out of the town, as it is very undesirable to have an accumulation of troops at the base itself.

The Base Staff, consisting of the Commandant of the Base, his Staff of the Adjutant-General and Quartermaster-General's Department, the Naval Transport Officer, the Disembarkation Officer, the Officers of the Medical, Commissariat, and Ordnance Store Departments should at once establish their offices and commence work when the foregoing preliminary points have been settled.

In the event of there being a railway leading in the direction of the advance, and the permanent way does not extend to the wharves, sidings should be constructed leading to the different quays.

In respect to railway organisation see Chapter VIII.

It is of importance to tell off a suitable building or to erect temporary sheds for a baggage store, to which the officers and men send those articles of their kit which cannot accompany the troops on the march. The separation is usually made on board ship. All articles should be carefully labelled with the names of the owners, and a trustworthy man from each regiment or corps left behind at the base to look after them.

Landing troops, stores, &c.

The troops and stores can now be landed at their respective wharves. The pressure here becomes so great that the whole of the combatant staff will be engaged in superintending the landing. Every effort must be directed to getting rid of the troops and stores, sending the former away to the camp selected outside the town and conveying

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the stores to their respective places of deposit. To this end either a strong working party of soldiers should be told off, or else, if available, resort should be had to civilian labour.* The rate of the landing will depend to a great extent on the means available for clearing away. It is obvious that any accumulation on the actual landing wharf obstructs traffic.

Clearing base of useless mouths.

At this period the Provost-Marshal and his Police should be active in causing the removal from the town of all useless mouths, and especially of suspicious and doubtful characters. All such persons are very much in the way and are consumers of provisions which may be urgently required for the troops. On the other hand, it is needless to say that all purveyors of food, except those selling liquor, should be encouraged, and every facility offered for establishing markets.

Sanitary condition.

The sanitary condition of the base is very important, and should be at once seen to. A latrine should be made in the vicinity of the place where the troops form up on disembarkation.

When the troops are all landed—a time, of course, varying with the size of the expeditionary force—the disembarkation, which has hitherto absorbed the attention of the whole Staff, may be left to the Naval Transport Officer and the Military Disembarkation Officer, who at all subsequent times, until the great pressure of re-embarkation begins, attend to the arrivals and departures of drafts, stores, &c.

On departure of field force, detachment left at base for protection.

After the field force has left the base and commenced its march inland, a detachment of varying strength is left behind at the base for its protection, and a depôt is formed at the base, where sick and wounded coming from the front are taken charge of until convalescent or fit for transport to England, and where drafts of reinforcements coming from home are received. Sick and wounded arrive from the front unable to look after themselves, with their accounts usually unsettled, and with no proper kit for the homeward voyage. To this camp would come all the troops before their embarkation at the close of the cam-

* At Ismailia, Arabs were hired, also the crews of merchant vessels, besides soldier labour. Sixteen tugs and launches and 84 lighters and horseboats were employed.

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paign. As a rule regiments and corps should arrive two clear days before embarkation, so that all returns may be completed before their departure, and that nothing may be left behind.

Duties of Commandant of Base.

The Commandant of the Base is responsible for all work connected with the disembarkation at or embarkation from the base, the preparation of the returns connected therewith, the furnishing such returns to the troops embarking and the reporting of arrivals and departures to the General of Communications, giving the names in the case of officers, as well as the numbers of the officers, non-commissioned officers, men, and horses.

For instance, the disembarkation returns in duplicate on Army Forms B 125 and 135, made out by the officers commanding troops, should be sent, after comparison, to the General of Communications directly the troops have been landed; while in the case of embarkations the returns in duplicate on Army Forms B 141, 142, 144, and 126, prepared by officers commanding troops, should be sent to the General of Communications for transmission to the Quartermaster-General, Horse Guards, or be transmitted direct according to arrangement. In any case a copy should be sent to the General of Communications so that the men may be struck off the strength of the command.

Marching-out states of all regiments and detachments, &c., leaving the base for the front, should be transmitted at once to the General of Communications. If going by train, they should be sent by the same train.

A daily state of all troops at the base should be kept, and a weekly return, giving the names of all officers, regimental and departmental, should be sent to the General of Communications. An order book should be kept, and an extract therefrom of all important orders sent to the General of Communications.

When the troops have left the base there will still be constant work in landing reinforcements, stores, &c., and embarking sick and wounded.

These duties devolve jointly on the Military and Naval authorities, and in order to give some idea of the arrangements necessary, mention may be made of the procedure mutually agreed upon by the Military and Naval authorities at Durban during the Transvaal operations in 1881,

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and which afterwards had the sanction of Brigadier-General Sir Thomas Baker, who later on was appointed General of Communications and Base.

Landing regulations, Natal, 1881.

All communications between the Commandant of the Base and the Principal Naval Transport Officer were sent through the office of the Military Landing Officer, one of the Staff of the Commandant of the Base.

On receipt of information from the War Office that reinforcements were on their way to Durban, the Commandant of the Base informed the Principal Naval Transport Officer; or, in the case of the Principal Naval Transport Officer getting the first intimation, he informed the Commandant.

On the arrival of the transport at Cape Town, the exact numbers on board were telegraphed to the Naval Transport Officer by his agents, as the War Office letter was not usually received until after the troops had arrived.

The Naval Transport Officer informed the Commandant of the Base, who in turn informed heads of departments.

Previous to the date on which the arrival of the ship was expected, the Naval Transport Officer requested the Commandant of the Base to say in what order he wished, for military reasons, the troops to be landed. On receipt of this information, the Naval Transport Officer sent the Commandant of the Base the special programme for the disembarkation, which he also communicated to the Naval Boarding Officer, the Transport Officer afloat or Master of the Transport, and the Naval Officer superintending the disembarkation at the wharf.

As soon as the transport anchored at Durban, she was visited at the same time by the Naval Boarding Officer and by the Military Landing Officer, through whom respectively the several orders and instructions as to the order of landing were given.

The Military Landing Officer, on boarding, gave the officer commanding the troops on board such further instructions as to the disposal of the troops on landing as had been determined, and then returned to the shore to receive the troops, horses, baggage, &c., on the wharf. The Naval Boarding Officer remained on board to conduct the disembarkation, and on its completion forwarded his report to the Principal Naval Transport Officer, who communicated its contents to the Commandant of the Base.

The troops, horses, stores, &c., were landed by contract with a local firm under the following arrangements:—

I.—Disembarkations.

1. In case of a vessel carrying troops, horses, &c., the Commissariat Landing Officer attends at the wharf on the arrival of each lighter, to superintend the measurement of regimental baggage and stores. After the men have been landed the baggage is brought ashore, and built compactly in stacks of convenient size for measurement. As soon as a stack is ready, it is measured by the contractor and the Commissariat Shipping Clerk, under the personal supervision of the

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Commissariat Landing Officer, and the result entered in rough tally books by both; it is then handed over to the regiment to load on railway trucks, which are standing ready. The number of men and horses landed are not taken then, but are given afterwards to the Commissariat Landing Officer by the Military Landing Officer on disembarkation returns. The Commissariat Landing Officer, however, receives from each lighter a boat note in Form "A," to give him an idea of what it contains. These boat notes are kept by him for further reference. On the completion of the day's work, the rough tally books are made up and compared by the Commissariat Landing Officer and the contractor, who mutually initial the totals as correct. After the ship is finally discharged, a return is made up by the Commissariat Landing Officer, on Form "B," showing the number of men and horses, and the tons of baggage landed. This return is signed by the contractor as agreeing with his account, and is then, having been signed by the Commissariat Landing Officer, transmitted to the Principal Naval Transport Officer for payment.

2. Cargo which is not shown as measured on the bills of lading is measured in the same way as baggage, but shown under the headings for stores in Form "B."

3. The checking of the actual articles is done by the Ordnance Officer for Ordnance Stores, and by the Commissariat Officer for Commissariat Stores. The cargo of hired transports, although generally shown as measured on the bills of lading, has been measured on shore for the satisfaction of the contractor in cases where they have doubted the correctness of the ship's measurement. This cargo has been stacked for measurement in such a fashion as the Principal Naval Transport Officer considered it should reasonably be stowed in the lighters.

4. The bills of lading of merchant steamers invariably show the actual tonnage of the stores carried, and the contractor accepts these measurements as correct. When, therefore, the whole cargo of such vessels has been landed and checked, the Commissariat Landing Officer enters upon Form "B" the tonnage of the various stores, as shown by the bills of lading and by those of the Ordnance Officer. The lighters discharging these vessels carry boat notes (Form "A") for each load, and these are given to the Commissariat Landing Officer for his information.

5. The Commissariat Landing Officer and the Ordnance Officer give to the contractors for each lighter load a receipt for the stores landed, and clear their bills of lading from the counterfoils of these receipts.

6. The Commissariat Landing Officer keeps a shipping book, in which he enters all transactions, either inwards or outwards, showing the number of men and horses, and the description and tonnage of all stores either landed or shipped. This book also shows the date of delivery of all Commissariat Stores to the Natal Government Railway for transport.

7. The stores are loaded daily as trucks are procurable by the Commissariat Landing Officer, and the cargo of each ship again checked into the trucks. For this purpose the cargoes of different ships are as far as possible kept separate from one another on the wharf.

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Waybills of supplies are sent with each consignment to the consignee, and when receipted form the issue voucher to the Commissariat account.

8. In case of steam vessels coming alongside the wharf and discharging at their own expense, as has been done by the Currie line of coast steamers and vessels of the class of the "Benona" and the "Limpopo," the Commissariat Landing Officer has either himself received the cargo with commissariat labour, or, if other work has been too pressing, has authorised the landing contractors to receive it, and paid them at the rate of 2*s.* 6*d.* per ton weight to stack it at a convenient place on the wharf, and afterwards to provide labour to load it in railway trucks as required. Such work does not come under the naval contract, but is an army charge. Mules and horses coming by these vessels have been received by the Commissariat, and taken up direct to the remount stables at Durban.

II.—Embarkations.

1. In case of embarking troops, &c., the baggage and stores are stacked on the wharf in the same manner as in landing operations, and, having been measured in a similar way, are at once put into the lighter.

2. The number of troops and horses are given afterwards by the Military Landing Officer, and all are entered on Form "B," exactly as when disembarked. A boat note is made up on Form "C" by the Commissariat Landing Officer, and sent with each lighter load, showing under "Cargo" any articles which may be sent as such, and a receipt for these is obtained from the master of the vessel.

Organisation of the Line of Communications.

Organisation of Line of Communications.

The General Officer of the Line of Communications and Base has a fixed Head Quarters on some convenient point of the line of communications, to which all letters from home and all correspondence would be addressed, and in his absence opened by the senior Staff Officer. The same place would also be the Head Quarters of his executive and administrative Staff. While having a fixed Head Quarters for convenience of office work, he would be constantly up and down the line, and for days or weeks together might be away at the Advanced Depôt or elsewhere making important arrangements. He would, of course, be in telegraphic communication with his own Head Quarters and with the Officer Commanding the Field Force.

Head Quarters.

In his office much of the routine work of the General Officer Commanding might be done, which could not be so conveniently transacted at the Head Quarters in the

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field, *e.g.*, the compilation of returns, publication of orders affecting the command generally, and the registry, transmission, and custody of all correspondence of permanent importance which it is necessary should be recorded for future reference.

This arrangement worked well during the Natal and Transvaal operations of 1881, when Brigadier-General Sir Thomas Baker was General of Communications and Base.

Depôts on Line of Communications.

The different depôts created on the line of communications as the army advances are numbered from base to front Nos. 1, 2, 3, 4, &c., the one nearest the army being called the Advanced Depôt. At the Advanced Depôt will be found the Ordnance Store Depôt and the Bakery Train, besides a large body of transport. As the Advanced Depôt is the one from which the field force draws its supplies directly, it requires careful organisation, and the officer at the head of it should be carefully selected for his powers of organisation and administration. In fact, as being the principal store depôt of the field force, the General of Communications will frequently be found there.

It is the duty of the General of Communications to keep the General Officer Commanding the Field Force constantly informed as to the position of the Advanced Depôt, and also of the stationary hospitals, remount depôts, and so forth.

Staff for Line of Communications.

Staff and their duties.

The Staff would include (besides the officers at the base): (1), officers of the General Staff (Adjutant-General and Quartermaster-General's Department) for carrying out the discipline, administration, quartering, transport, &c., of the troops guarding the line and of those temporarily passing along it; (2), one or more Commandants for the road or section of the road, who see to the military occupation and defence; (3), one or more Engineer Officers for buildings, defensive works &c.; (4), a Military Officer as Director of Railways to superintend and be responsible for the technical working of the railway, but receiving orders as to the transport of troops and stores from the Head Quarter Staff; (5), an officer of the Commissariat and Transport Staff to look after the supply and transport services, to take up the necessary auxiliary transport, to make

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purchases and requisition supplies, and to create depôts as the army advances; (6), an officer of the Ordnance Store Department to make timely arrangements for the provision of warlike stores, to forward them to the front, and to create depôts; (7), an officer of the Medical Department to superintend the hospital and sanitary services on the line, to make arrangements for the movement from front to base of sick and wounded, to form rest camps, to open hospitals, and to make preparations for the embarkation of sick and wounded on board hospital ships; (8), a veterinary surgeon for looking after the horses in remount depôts and sick depôts; (9), an officer of the Pay Department; (10), a Provost Marshal for police duties; (11), an officer for Field Postmaster; and (12), an officer for the Civil Administration of the occupied territory, if required.

Arrangements for Movements along the Line of Communication.

Movements along line.

The General of Communications keeps the General Officer commanding the Field Force informed of the departure from the base of all reinforcements, while the progress of those reinforcements along the line will be reported by themselves at each principal stage to the General of Communications, so that he may know where they are at any given moment.

The following were the arrangements in Natal, 1881:—

Arrangements for movements, Natal, 1881.

The arrival and departure of all troops in the command will be notified in General Orders.

On the Commandant of any station receiving instructions from the General of Communications relative to the movement of troops, &c., from that command, he will give the necessary orders, and issue routes. He will, at the same time, furnish to the Commandant of the next station a *movement report*, stating their destination, date of departure, probable date of arrival, and object for which proceeding; reporting, at the same time, by telegraph to the General of Communications the time of departure.

The Commandant of the next station to which the troops are proceeding, on receipt of the *movement report*, will at once make preparations for the reception of the troops and for sending them on to the next station, furnishing a similar *movement report* to the next Commandant, and reporting by telegraph to the General of Communications.

Routes provided by Commandants should not be departed from without an immediate report being made to the Commandant.

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Commandants should furnish the Station Heads of Departments with a copy of the *movement report* issued and received by them as early as practicable, in order that arrangements may be made for the reception and despatch of the troops. Arrivals and departures should also be notified in Station Orders.

Weekly state form, Natal, 1881.

Officers commanding regiments, corps, and detachments on the lines of communication will furnish to their respective Commandants every Monday morning a weekly strength state on the following form :—

Station_____ Corps_____ Date_____

Stations.	Corps.	Officers.				Foot.		Mounted.				Guns.				Remarks.
						N.C.Os. and Men.		N.C.Os. and Men.		Horses.						
		Field Officers.	Captains.	Subalterns.	Staff.	Effective.	Non-effective.	Effective.	Non-effective.	Effective.	Sick.	9 Pr.	M.L. Rifled.			
Total ...																

In standing camp or quarters, non-effectives to include all not in the ranks.

In the field, sick only to be shown as non-effective.

No. and description of Arms_____

Amount of Ammunition per man_____

Amount expended since last return_____

The names of all Officers present should be recorded on the reverse of the form. The Commandants will forward these returns, together with one on the following form to the General of Communications with as little delay as possible, notifying in the column of remarks any men, troop or battery horses belonging to Regiments, Corps, or Batteries not in their command, and who are available to be sent to join their Head Quarters.

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Station_____ Date_____

Stations.	Corps.	Officers.				Foot.		Mounted.				Guns.			Remarks.
		Field Officers.	Captains.	Subalterns.	Staff.	N.C.Os. and Men.		N.C.Os. and Men.		Horses.		9 Pr. M.L. Rifled.			
						Effective.	Non-effective.	Effective.	Non-effective.	Effective.	Sick.				
Total ...															

In standing camp or quarters, non-effectives to include all not in the ranks.

In the field, sick only to be shown as non-effective.

The following information should be recorded in the weekly state, viz. :—

Amount of ammunition kept as a reserve at each station and post, which should not be less than 200 rounds per rifle for the established strength of the post.

Number of weeks' supplies, which should not be less than four weeks for the established strength of the post.

Number of entrenching tools in charge.

Commandants will be good enough to provide, as far as possible, that all details leaving their command are accompanied by their documents, and Officers Commanding are requested to ensure that all casualties leaving their Regiments and Corps are so accompanied.

All Commanding Officers, Detached Officers, and Officers on leave, of whatever rank, arriving at any station, are invariably to report themselves immediately to the Commandant.

At Pietermaritzburg and Durban they should record their names and addresses, and duty on which proceeding, in a book which is provided for that purpose in the Commandant's office.

All Detached Officers, previous to their leaving a station, are to provide themselves with a copy of the Station or General Order under which they are proceeding, to be produced to the Commandants to whom they report themselves.

Repair of road.

The traffic along a road which serves as the line of communication of a large force is as a rule so great, that even

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if in good order at first it rapidly falls into bad condition, unless from the outset considerable bodies of workmen are employed upon it.

In many cases it is desirable, instead of using soldier labour, to employ gangs of natives on the work. They must be properly organised under overseers and officers.

To keep in repair the line from Pietermaritzburg to Newcastle in Natal, 1881, a Road Pioneer Corps of 5 officers and 200 Natal Zulus was raised, and placed under the Royal Engineers.

The Protection of the Line of Communications.

Defence of line of communications.

The line of communications, particularly when it lies in hostile territory, may be menaced by the enemy's troops or by the local population.

Against the enemy's main forces, the line of communications and its depôts should be protected by the disposition and movements of the field force; but to ward off the attacks of small bodies of the enemy assisted by the local population, the line of communications should have a special body of troops entirely distinct from the field force.

Nature of troops employed.

For a campaign in Western Europe the Militia would furnish excellent line of communication troops, but in our Indian and Colonial wars regular troops must be assigned for the purpose, supplemented, where available, by friendly contingents.

The number and description of troops required to guard the line of communications will depend on its length, the nature of the country through which it passes, the number of important points to be held, and the temper of the inhabitants. Not merely has the road to be held, but a band of territory on either side and the inhabitants thereof held in subjection.

Number of troops.

Our Regulations give the following estimate of the number of troops required for a line of communication 150 miles in length in a quiet country:—

1 Regiment of Cavalry, 3 Batteries of Field Artillery, 3 Companies of Royal Engineers, 3 Battalions of Infantry. Total all ranks, 4,700.

Of these, one battalion would be at the base, one on the line of communications, and one at the advanced depôt; the

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Cavalry, Artillery and Engineers being employed where their services are most needed.

But it is plain that the numbers must vary with the circumstances of each war. For instance, in the Afghan Campaign, the number of troops employed in March, 1880, on the Khyber line and at the base at Peshawur exceeded 20,000 men. In this case the line of communications (Jamrud to Cabul) was only some 160 miles long, but it passed through a difficult country inhabited by a hostile population.

The protection of the line, as already mentioned, is usually entrusted to a special Commandant, but if long or difficult to several commanders, who have charge of sections of it. All of these are subordinate to the General of Communications and Base.

When there are large bodies of troops for the defence of the line, station Staff officers should be appointed at the more important posts, in order to enable the Staff of the Brigades scattered along the line to devote their time to the troops, or to reconnoitre, or to move away with flying columns.

Determination of posts to be occupied.

The General of Communications determines the different posts to be held along the line and their garrisons, and also where the reserves are to be held for use as flying columns.

The important posts are towns and villages, bridges and fords over rivers, bridges, tunnels, &c., on railways, where traffic might be easily stopped if the enemy could reach them unmolested, the debouchures of a pass, and so forth. Other points for posts would be the rest depôts and commissariat depôts.

Distance of posts.

The posts would usually be a day's march apart, say 10 to 12 or 15, or even 20 miles, in cases where there is no convenient place for a halt, but might be at less distance in the case of an important point intervening.

Sometimes, in consequence of the insalubrity of a district, it may be impossible to maintain a post permanently at some spot where it may from other circumstances be urgently required. In this case large convoys and well-equipped movable columns will be necessary for the supply arrangements and for the protection of the line.

Staff of post.

The staff of each post depends on its importance;

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places containing magazines, hospitals, &c., requiring a larger staff than a simple resting station.

Garrison of post.

The garrison of each post would consist of infantry and cavalry, and sometimes also of guns. Cavalry are necessary for conveying messages, escorting mails and officers, and for patrolling, not only from post to post, but also at some distance on either side of the line of communications.

In addition to the regular garrison of each post there would be flying columns organised at certain stations in disaffected districts on the line.

Commandants of posts: their sphere of command.

After the number and garrisons of the different posts have been determined, a permanent Commandant should be appointed—the senior officer on the spot—whose authority is not to be superseded by the accidental presence of a senior officer passing through, except, of course, in actual operations against the enemy, when the senior, according to the custom of the service, would take command.

Post commanders should be kept informed by the Communications Staff with the locality in which each part of the field army is serving, with the object of directing different parties to their destination. They should be in constant communication with Head Quarters and with one another.

The officer commanding at each post on the line includes within the limits of his command the road on either side half-way to the next post. His authority—subject, of course, to the superior authority of the Road Commandant, the General of Communications, and the General Officer Commanding—will be paramount, and his responsibility for the regular and safe transit of troops, stores, &c., will be complete. He will endeavour to obtain all the information possible as to the attitude of the inhabitants of the neighbourhood, and upon all matters likely to affect the safety of the road.

As attacks upon individuals, &c., are more likely to be made at night, the road is generally closed between nightfall and daylight, except for specially arranged night marches.

Escorts.

Special escorts for officers and others (with the exception of those for whom they are directed by line of communication orders) will only be detailed when, from urgent causes, such officers cannot accompany the daily convoy.

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The strength of the escorts must, of course, vary with the degree of danger. Parties escorting treasure should be under an officer.

Defence of post.

The post should be placed in a state of defence—entrenched—the strength of the works being proportionate to the arms used in the country.

Reserve of supplies.

Each post should have a reserve of supplies—provisions, fuel, forage and water—stored for its own use and also for passing detachments.

Sanitary condition.

The sanitary condition of the post should be carefully attended to.

At all the principal posts there should be a Medical Officer, a Sanitary Officer, and a Camp Quartermaster—who, in addition to other duties, superintend sanitary arrangements, general conservancy, water supply, &c. Care should be taken to select ground for latrines, not only for the troops, but for the camp followers. Such ground should be defined by some permanent mark, so as to prevent the possibility of its being used afterwards by regiments for camping.

The best means of disposing of dead animals is to cut them open to prevent their swelling, and bury them under three feet of earth, or else disembowel them and fill the interior with straw, dried grass, or twigs, which, when set fire to, consume the whole carcase.

The death of all transport animals on the line should be reported at the next station, so that a special party may be sent out to dispose of them: a dead animal left in a river bed is a fertile source of contamination of the water supply.

Latrines should be erected to leeward in reference to prevailing winds.

Camping grounds.

Selected camping grounds should be told off for the mounted and dismounted arms respectively; thus grounds for infantry should never, if possible, be used by cavalry, and latrines should be dug always in one and the same neighbourhood.

Regiments should be held responsible for the cleanliness of their camps, and for leaving them clean on departure.

At the Commandant's office of each station a rough sketch of the post and adjacent ground should be hung up, marking the water supply, bathing places, encamping grounds, cholera camps, latrines, &c.

For further information as to camps, &c., see Chapter V.

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Line of Communications (Khyber) in Afghanistan, 1880.

Kabul line of communications, 1880.

In the Afghan Campaign the line of communications between Jamrud and Cabul (160 miles) was divided into three sections, each under a Brigadier-General (also Road Commandant) the whole under the command of a Major General as General of Communications. At three of the stations there were flying columns.

The 1st Section—Jamrud to Basawal, 43 miles—Head Quarters at Lundi Kotal, where was posted a flying column.

Posts at Jamrud, Fort Maude, Ali Musjid, Lundi Kotal, Lundi Khana, Haftchah, Dakka, Basawal (including Pesh Bolak).

The 2nd Section—Chardeh to Fort Battye, 46 miles—Head Quarters at Jellalabad, where there was a flying column.

Posts at Chardeh, Allachipur, Jellalabad, Rozabad, Fort Battye.

The 3rd Section—Safed Sang to Butkhak, 60 miles—Head Quarters at Safed Sang. Flying column at Gundamuck.

Posts at Safed Sang, Pezwan, Jagdalak Kotal, Jagdalak, Seh Baba, Lataband, Butkhak.

Most of the posts had cavalry as well as infantry, and some had guns.

The movable columns were equipped and furnished with full carriage and transport for 7 days' supplies, which were afterwards increased to 15 days.

There were Station Staff Officers at Jamrud, Lundi Kotal, Jellalabad, and Safed Sang, irrespective of the Staff of the Brigadiers of Sections.

The General Officer at the base, Peshawur, supervised everything connected with the forwarding of troops, transport, and supplies for the Field Force on the Khyber line.

Line of Communications in Natal, 1881.

Natal line of communications, 1881.

The line of communications from the base at Durban to the advanced depôt at Newcastle extended over a distance

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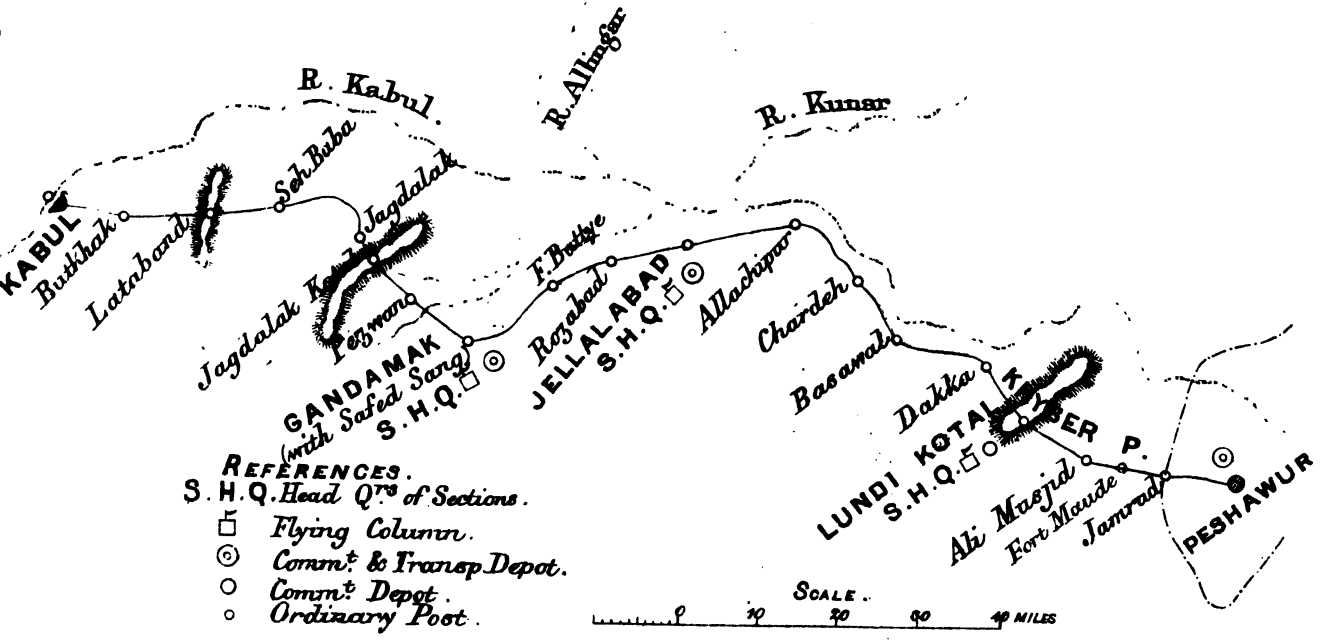
SKETCH MAP
Showing
KHYBER LINE OF COMMUNICATIONS.



DANGERFIELD. LITH 22. BEDFORD ST COVENT GARDEN 682C

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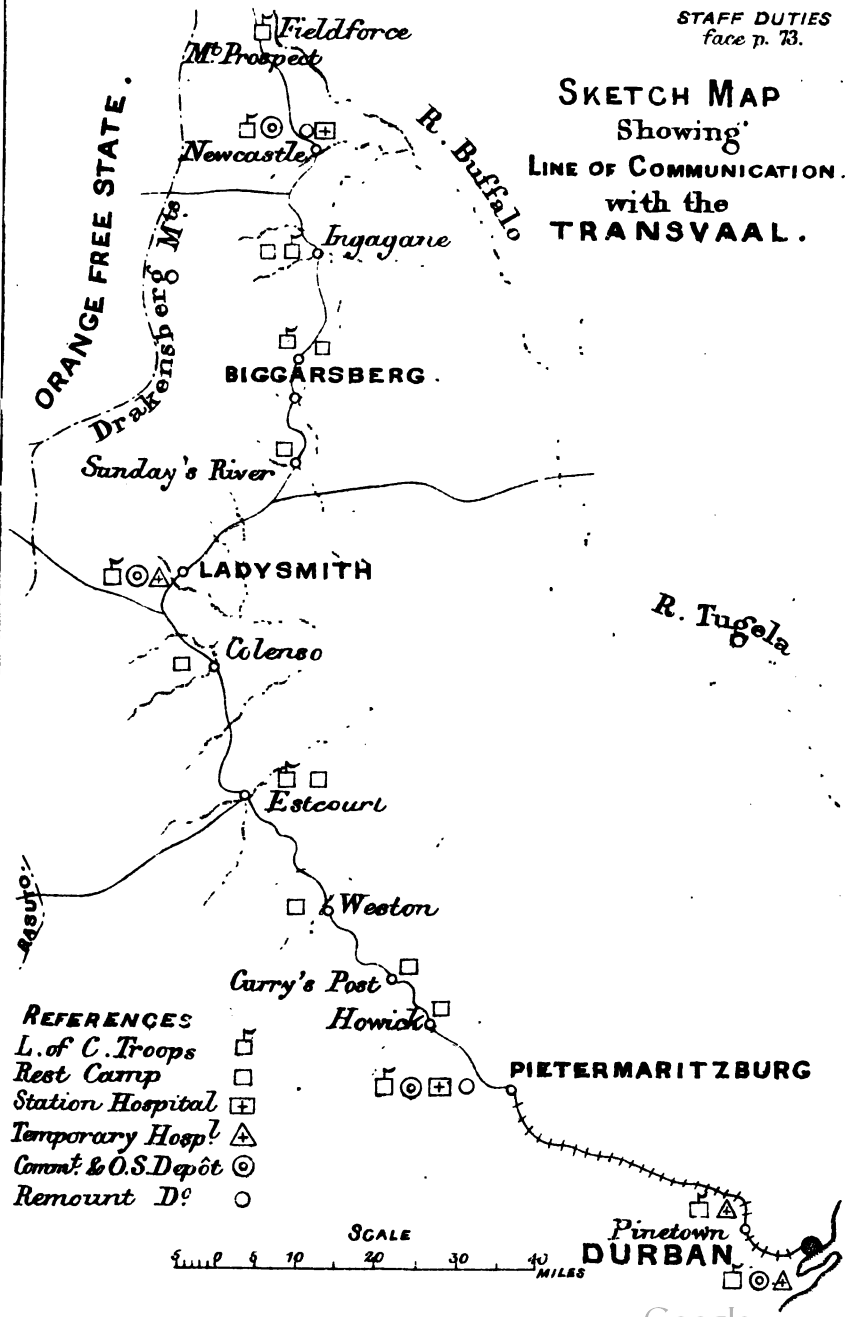
STAFF DUTIES
face p. 73.

SKETCH MAP
Showing
LINE OF COMMUNICATION.
with the
TRANSVAAL.



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of 285 miles, of which 54 miles (Durban to Pietermaritzburg) consisted of a single line of railway.

From Pietermaritzburg to Newcastle the road rises in places to a height of 3,300 feet above the sea-level. Many rivers have to be crossed; there is no permanent bridge north of Colenso. Between the latter place and Newcastle the road is flanked by the Orange Free State, and is therefore open to incursions.

The passes leading to the Orange Free State were watched by native scouts and Natal Police, while at points of importance troops were posted in support on the line itself.

The line was divided into four sections, each under a separate Commandant, who was also Road Commandant. The *first section* extended from Durban to (but exclusive of) Pietermaritzburg, under the Commandant of the Base. The *second section* included the road from Pietermaritzburg to (but exclusive of) Ladysmith, and was under the Commandant at Pietermaritzburg. The *third section* extended from Ladysmith to (but exclusive of) Newcastle, under the Commandant at Ladysmith. The *fourth section* would have comprised the road from Newcastle—the Advanced Depôt—to the front, but owing to the cessation of hostilities included the post at Newcastle only.

The Head Quarters of the General Officer of Line of Communications and Base were at Pietermaritzburg, at which were also established the Head Quarters of the Administrative Departments in Natal.

The protection of the line of communications was entrusted to regular troops and detachments of Natal Police, who were posted at the more important points on the line. Posts of mounted native scouts were also established at Estcourt, Colenso, Ladysmith, Biggargsberg, and Ingagane. Redoubts were constructed at Colenso, Ladysmith, Biggargsberg, and Ingagane, in addition to the strong stone fort at Estcourt.

Had hostilities been resumed, preparations were made by Sir Thomas Baker to form a flying column for the purpose of defeating any attempt to interrupt the line of communications.

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CHAPTER IV.—MARCHES

Important subject.

THERE is, probably, no branch of the military art which demands in a higher degree the attentive consideration of Staff Officers than the subject of marches. The duties of patrol and outpost service devolve only upon a small part of the force, the days of actual fighting occur only at intervals, but all the troops have to march daily.

When it is remembered that marches serve as the means for the timely concentration of the forces at decisive points of the theatre of war, for placing them prior to the engagement in a more favourable position relatively to the enemy, and that "a well-executed march may raise the morale and pave the way for success in battle,"* or may be the means of avoiding a disadvantageous encounter, it becomes plain that the subject demands very careful study.

Success lies in husbanding men's strength,

The secret of success in marches consists in husbanding the men's strength in ordinary circumstances, so that at the critical moment they may be capable of an extraordinary effort. Not only must we avoid useless marches—for they waste the strength of the men and, what is worse, destroy confidence in their leaders—but we must endeavour at all times to counteract the disadvantageous influences at work, by not submitting the soldier to unnecessary exposure or trying him by insufficient food or clothing.

and avoiding useless marches.

The appearance of a regiment after a march and the number of stragglers from its ranks give a good criterion of its efficiency and fighting value.

Procedure depends on distance of enemy and

Marches may be conveniently considered under the two main conditions:—(1) at such a distance from the enemy that collision is impossible; and (2) in proximity with the enemy, when an encounter may happen at any moment.

* Napoleon.

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Marches under the second condition will further vary with the circumstances, *i.e.*, whether the march is on the offensive, or retrograde, or flank, or made at night. other circumstances.

But before we proceed to consider the various conditions in detail, it may be observed generally that for all marches there are two main elements of success—rapidity and order. Two elements of success.

(1) *Rapidity.*—Napoleon has well said that "In war time is estimated by minutes." By rapid movement we can forestall the adversary at a given point, concentrate our troops in good time, stand in a relatively better position, take advantage of his mistakes, or, if necessary, avoid the contest. On the other hand, slowness may lead to the failure of the best-planned enterprise, by giving the enemy time and means to counteract it. (1) Rapidity.

"The secret of victory lies in the legs."*

(2) *Order.*—The maintenance of strict order is of first importance. Otherwise, the march becomes irregular and fatiguing, while any change to fighting formation, or any alteration of the direction becomes difficult; the troops pass out of hand and discipline suffers. (2) Order.

The further conditions of success vary with the circumstances in which the march is made. Thus, when the enemy is beyond striking distance, the main point is to spare the troops; that is to say, to husband the strength of the men and horses. To this end the troops should have every comfort, both in respect to their march, their rest on the road, and their supply. On the other hand, when within striking distance, when in fact an encounter with the enemy may happen at any moment, the chief conditions are: secrecy, security for the troops, and their constant readiness for fighting in all circumstances. Further conditions of success.

A.—Marches beyond Striking Distance of the Enemy.

In order to fulfil the before-mentioned conditions of rapidity and order, combined with saving the troops, it is desirable— Procedure desirable.

(1) To keep each arm separate,

(2) To move the troops in echelons or by several roads.

* Maurice, Count of Saxony, usually called Marshal Saxe.

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(3) To distribute in the best manner the troops by roads and echelons, to arrange with care their night-halts and halting days, and for each stage to apportion suitably the time for marching and for rest.

(4) To prepare quarters and supplies beforehand along the line of march, and

(5) To maintain order and take sanitary precautions during the march.

(1) Separation of the arms.

Each Arm separate.—Between the various arms of the service, there are differences not only as regards rate of movement, but also in respect of a convenient hour for starting, requirements as to road, and distribution of time on the march. If these differences be not taken into account, and the troops placed in one general marching column, then instead of *sparing* them an entirely opposite result would ensue. For instance, the rate of march of the mounted branches to that of the infantry, being as six to five, to mix them up in the same column would cause discomfort to all.

An exception to this general practice may be made when moving through a difficult country. Thus, in a march over a mountain pass or a sandy plain, it is sometimes advantageous to have the infantry interspersed with the guns, in order to utilise their strength in surmounting any obstacles which may present themselves.

(2) Movement by echelons

Echelons.—Movement by successive echelons at a day's march apart facilitates quartering and supply. Were the whole body moved together, not only might inconvenience arise from having a large number of troops on the road at one time, but parts might have to go some distance off the road to their quarters, and have to return to it next morning, thereby increasing the length of the march and fatiguing the troops uselessly.

Assuming the limit of extension on either side of the road, consistent with the convenience of the troops, to be from 2 to $2\frac{1}{2}$ miles, it becomes clear that the strength of the echelons will depend on the number and size of the towns, villages, and hamlets within the band of country so included. The more populated the district, the larger may be the echelons.

or by several roads.

In order to facilitate the movement of troops, several distinct roads may be assigned to them. If a body of

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troops extends considerably in depth when moving by one road, then, by moving it on two or three roads, it will evidently occupy one-half or two-thirds less space in depth, and consequently the concentration of the troops at a given point can be accomplished in less time. Again, by directing the troops along several roads, the latter may to a certain extent be assigned according to their suitability for the different arms, and the troops thereby spared.

(3) Selection of roads for different arms.

Selection of Roads for the different Arms; arranging Marches; Suitable distribution of the Time.—In the selection of roads for the different arms, the infantry should, as a rule, be assigned the shortest road. Cavalry should have broad and soft roads, provided they are not swampy; they may be hilly (without steep ascents), sandy, or a little roundabout. Lastly, artillery, the mounted branch of Engineers and the train should have the best road, hard and level, even if a little roundabout and narrow.

As a rule it may be laid down that in arranging for the march of a body of troops, the main roads are the most to be relied upon for all weathers; but this general rule does not preclude the use of any road which may have been examined and found practicable by the Staff.

Marching powers of troops vary according to the arm and other circumstances.

It is a generally admitted principle that for a complete rest after a sustained effort—such as a long march—at least 12 hours in 24 are necessary for both man and horse. Deducting from the remainder an interval of 3 or 4 hours for preparation for the march and for duties at the close, and from $1\frac{1}{2}$ to 3 hours for halts on the march itself, there will ordinarily remain for actual marching an interval of from 5 to $7\frac{1}{2}$ hours in the 24.

Let us now see what the different arms can accomplish in this time; remembering that we are speaking of small bodies of troops, out of striking distance of the enemy, and marching for convenience by echelons, or by different roads: small bodies marching independently.

Infantry, with a good road and favourable weather, can accomplish in these circumstances $2\frac{3}{4}$ miles an hour; cavalry and horse artillery, 5 miles; field artillery and train, 3 miles. Consequently, in the interval (5 to $7\frac{1}{2}$ hours) the length of the actual march would be $13\frac{1}{2}$ to $20\frac{1}{2}$ miles for infantry, 25 to 35 miles for cavalry and horse artillery, 15 to 22 miles for field artillery and train.

These rates decrease as numbers increase, so that,

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practically, in Divisions for instance, infantry cannot accomplish more than 2¼ to 2½ miles, and in Army Corps not more than 2 miles per hour.

If the movement continues for several days, it is necessary to halt for a whole day at intervals, in order to recruit the strength of the men and horses, and, more particularly, to repair material. The number of halts, therefore, will depend on the condition of the troops and the state of the material.

It follows that halting days are most necessary for the arms which have the most complex material.

The length of a march also depends upon a variety of other circumstances, namely,—

(*a*) On the moral and physical condition of the troops.

(*b*) On their state of preparation for the field. If after a prolonged rest on board ship, for instance, the advance is commenced forthwith in long stages, the troops will suffer greatly; the men are out of condition and they become footsore. It is necessary that men and horses should be gradually accustomed to the field, by arranging the marches in such wise that the first are less than the normal, while those succeeding gradually increase in length.

(*c*) On the nature of the roads, the country, and the supplies; that is to say, the breadth and quality of the roads, the number and gradient of the ascents and descents, the character of the soil, the position and capacity of the villages, and particularly the water and wood along the route.

In the East generally water is a most important factor in determining the length of a march; sometimes it becomes paramount.

For instance, the position of the look at Kassassin determined the first marches of the Expeditionary Force in Egypt in 1882. So also in Afghanistan, the position of the water regulated the marches. In the Russian Expedition to Khiva, in 1873, the marches were arranged from well to well, and consequently the troops had to march distances of 24 to 27 miles in the 24 hours, under intense heat and across a sandy, shadeless desert.

Over bad roads the progress of the troops is considerably retarded, and the length of the march has to be diminished.

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In 1815 (before Waterloo) Vandamme was 7 hours marching from St. Amand to Gembloux—10 miles; and 6½ hours from Gembloux to La Baraque—the same distance. The Prussian columns, on the day of Waterloo, averaged only 1½ mile an hour.

Colonel v. Schellendorff, in his "Dienst des Generalstabes," states that a battalion of infantry or field battery would, on a good road and under favourable conditions, complete an ordinary day's march of 14 miles in 5 hours, and a cavalry regiment or horse artillery battery in 4 hours; while with a bad road, other conditions being favourable, the battalion or field battery would require 8 hours, and the cavalry regiment or horse artillery battery 6 hours; and under very unfavourable conditions they would respectively be 12 and 9 hours accomplishing the distance. As the unit increases in size, the influence of the road and other conditions becomes more emphasised. An Infantry Division, which with a good road and other favourable conditions, would march the 14 miles in 6 hours, would, with a bad road, other conditions being favourable, take 9 hours, and under very unfavourable conditions, 14 hours. Bad conditions affect the train still more. Thus, on a good road and under favourable conditions, the baggage train would march 14 miles in 6 hours, but under very unfavourable conditions would take 20 hours to accomplish the distance.

(*d*) On the time of year and the state of the weather; and, lastly,

(*e*) On the number of troops moving in one general column. The deeper the column, the more difficult to maintain uniformity of movement; consequently, the more fatiguing for the troops, and the less number of miles accomplished in the day.

Average length of march.

The average length of a day's march of a large body of troops (*e.g.*, a Division moving by one road) under ordinary conditions may be taken at 12 to 15 miles, halting every fifth or seventh day. Fifteen to 20 miles is a long march, and above 20 miles is usually a forced march. Allowing for a halt every fifth day the minimum daily progress of the troops may be taken at 10 miles.

One of the best prolonged marches on record is that of Napoleon, from the Channel to the Rhine, in the autumn of 1805. The distance, 395 to 412 miles, was accomplished in 25 and 26 days—average 16 miles a day, or 20 miles with halts every fifth day. There were very few casualties, and the troops reached the Rhine in excellent condition.

No enemy being near, this march could be executed by Divisions on separate roads and the comfort of the troops studied. Compare his march into Russia in 1812. In this case the enemy was near; the troops had to march by a single road and in a state of readiness for battle. The supplies had to be brought up from the rear, and there were other in-

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conveniences incidental to a state of war. The distance from the Niemen to Smolensk was 400 miles, but the troops were 50 days accomplishing it, and did not advance more than 12 miles a day on marching days, or 8 miles on an average. The loss of men on the march was 33 per cent.

In August, 1880, General Sir F. Roberts marched from Cabul to the relief of Candahar. He reached Khelat-i-Ghilzai—232 miles—in 15 days—an average including halts of 15½ miles a day. His longest marches in any one day were 20 and 21 miles.

Before the Hazara Campaign, in 1868, the 20th Punjaub Native Infantry marched from Lahore to Abbotabad—232 miles—in 10 days in the hottest season of the year. In the same movement, the 1st Battalion 6th Foot made a forced march at night of 20 miles, in the hottest season of the year.

In the Crown Prince's pursuit of MacMahon's force in August, 1870 (26th to 30th), the actual marches averaged 15 to 20 miles a day. The troops were sometimes on the road from 4 a.m. to 8 p.m.

In October, 1870, the 18th German Division marched 260 miles in 9 days, an average of nearly 18 miles a day.

Arrangement of marches.

In arranging a march, it must not be regarded as an isolated act, but as part of a whole; the plan for the morrow should have in view the scheme for the day after. The distribution into stages should not be by mechanically taking the average. Better to make an increased march one day and a less long one the next, if circumstances render it desirable; for instance, if we wish to traverse quickly an unhealthy district, a long defile, or if we desire an early occupation of an important strategical point. Considerations of water, better quarters, supplies, &c., often lead to an increased length of march.

Hour of departure.

A suitable distribution of time for each march is of great importance as regards husbanding the strength of men and horses. The departure of the various corps from the halting-place should not be fixed for too early an hour, as assembling in the dark is apt to produce confusion, and the men's rest is unnecessarily curtailed. On the other hand, the time of departure must be so arranged that the troops reach the next halting-place before the great heat of the day, and in winter while there is still daylight. Sometimes the march has to be divided into two parts—one to be completed before the sun becomes powerful, and the other when the heat begins to moderate.

The hour of departure, therefore, depends on climate, time of year, and the length of the march. As a general rule, it is desirable to get over the march as early as pos-

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sible, in order to give time for pitching camp, cooking, repairing material, and long rest.

Infantry, having a less complex material, may start earlier than the other arms, but not earlier than one hour after daybreak. Cavalry, artillery, and train should not commence their march until after morning stables and feed, that is to say, about two hours after daylight. These rules are subject to variation in hot climates, on moonlight nights, or in other special circumstances.

The start can be made at an earlier hour from bivouacs than from cantonments.

Halts

In marching it is necessary to halt at intervals, for a longer or shorter time, so that the men and horses may ease themselves and rest a little.

Long halts may be of ½ to 2 hours' duration, short halts under ½ hour. The duration of a long halt depends on the length of the march, the difficulties of the road, and the condition of the troops. They are particularly necessary for infantry; they may be less long for field artillery, and are not required at all for cavalry and horse artillery. These latter, instead of long halts, dismount for a few minutes from time to time.

Short halts are appointed as required after every 1, 1½ or 2 hours' march. Frequent stoppages, especially if accidental and not intended, are more fatiguing to the troops than advantageous.

For the train, if the distance is not great, the road good, and the horses fresh, no long halt should be given; but in long and difficult marches and with tired horses, long halts—3 to 4 hours—must be allowed, so that the horses may be fed and rested.

(4) Preparation of quarters and supplies.

The timely preparation of quarters, supplies, and forage is very important for sparing the troops.

In moving considerable forces by road, the duty of making the nightly distribution of the troops devolves upon the officers of the Quartermaster-General's Department, who for this purpose proceed with the leading echelon of their command. But wherever it is possible, in order to avoid any waiting about on arrival, arrangements for camps, bivouacs, or quarters should be made beforehand by sending ahead officers, quartermasters, and camp-colour men, who will then be able to direct the troops by the nearest route to their respective quarters. The furnishing of supplies and forage rests with the Commissariat.

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(5) Maintenance of order

Maintenance of Order.—As already stated, the maintenance of strict order is necessary for the preservation of discipline, for husbanding the strength of the men, and, indirectly, for celerity of movement.

The following are the main rules to be observed:—

(*a*) The head of each separate column must march at an even pace.

(*b*) No one must quit the ranks without permission. This is particularly necessary when passing through a village, where men might get hold of liquor.

(*c*) The men may march at ease, but must not straggle nor follow too closely; in the event of opening out or closing up, the relative distances must be restored by a gradual acceleration or retardation of the pace. In the case of the mounted arms, the men must not be permitted to lounge on their horses.

(*d*) The Commander of each separate column should give the men all the rest possible; he should take care that the halts are made at a fitting time and at convenient spots.

and sanitary precautions.

(*e*) All precautions with regard to health should be adopted, such as greasing the stockings, avoiding chills consequent on exposing men perspiring profusely to cold blasts across open moorland or similar places, and selecting by preference screened localities for the halts.

In very hot weather in India, each company should march in very open order, taking three or four times the space they would occupy in ordinary circumstances, and with a distance of 20 yards between the companies, for the purpose of ensuring a free circulation of air through the column. An unlimited supply of water should be carried. (1st Battalion 6th Foot in the Hazara Campaign.)

Means of Accelerating the March.

March may be accelerated

Strategical and other considerations (*e.g.*, to relieve a beleaguered force, in pursuits, or for seizing important strategical points) frequently require the ordinary rate of field marches to be accelerated. This may be done by curtailing the intervals of rest, increasing the pace, both of these conjointly or by artificial means.

by shortening the halts,

It will be found that shortening the intervals of rest is more advantageous than quickening the pace. If the

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troops are in good condition the deprivation of the short halts and part of the long halts would cause them little inconvenience. But the rate of marching can only be increased to a limited extent for a short distance at the end of a march.

If the movement of the troops has to be hastened for several marches, the number of halting-days must be curtailed or the daily rate increased, or both means used conjointly. or curtailing the halting-days, or

The number of halting-days cannot, as a rule, be reduced below one per week,* but the marches may be increased, under good conditions, to 20 miles for infantry, 35 miles for cavalry and horse artillery, and 20 miles or more for field artillery and train. increasing the marches.

It will be generally found advisable to use both these means conjointly.

Forced Marches.—It is somewhat difficult to draw the line between ordinary and forced marches. The latter are not determined by the length in miles, but by the number of hours under arms; the same number of miles may be an ordinary march in certain circumstances and a forced march in others. It has been already said that for a complete rest after a march 12 hours at least are required; if then troops, from whatever cause, take so long for their march that they have less than 12 hours' rest, or are more than 10 hours in movement, the march becomes a forced one. Forced marches.

Thus, for example, in mountainous countries, where troops not habituated cannot do more than two-thirds of a mile per hour, marches of more than 7 or 8 miles will be forced; along sodden roads, over sand, or in very unfavourable weather, marches far below the normal will also be forced.

As examples of forced marches the following may be cited:—

(1) General Crawford, with the 43rd, 52nd, and 95th Regiments marched to reinforce Sir Arthur Wellesley at the Battle of Talavera in July, 1809; the brigade marched 62 miles in 26 hours, carrying arms, ammunition, and pack, some 50 to 60 lbs. in all.

(2) Bulow, on the day of Ligny (16th June, 1815), marched from Liège to Hannut. At the last place he received orders to push on;

* The 3rd German Army, in its movement to Sedan, marched for 2 days consecutively, and on the 10th fought the battle.

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and, after marching again till 9 p.m., halted a few miles short of Gembloux. The bulk of his corps marched 36 miles.

(3) The 2nd German Corps on 18th August, 1870, marched 21 miles, and afterwards went into action. This corps was under arms for 20 hours.

(4) In December, 1870, when the German position on the Loire was threatened, the 9th German Corps (with an effective reduced to that of a Division) marched from La Chapelle Vendômoise (near Blois) to Orleans—about 42 miles—in 33 to 36 hours, after previously marching 9 miles. Frightful weather and roads.

(5) In the Persian Expedition of 1856–7 a British force of 4,650 men and 18 guns, carrying greatcoats, blankets, and two days' food, marched from Bushire to Borazjoon—46 miles—in 41 hours, in the worst weather. On their return march, accomplished in 50 hours, they defeated the Persian army hanging on their flanks. "Almost an impassable country."

Forced marches cannot be continued beyond 2 or 3 days at the most, without interfering with the fighting powers of the men.

Cavalry, accompanied often by horse artillery, is the arm most generally called upon to make a forced march. It has been known to accomplish 50 miles in a day, and even greater distances.

(1) On 21st January, 1871, a squadron of dragoons belonging to General v. Werder's Corps, which had to establish connection between that Corps and the 7th Corps, marched 64 miles in 12½ hours, and, without feeding the horses, returned next day, having completed 125 miles in 36 hours.

(2) In 1877–8 a brigade of two regiments of Russian Cavalry, with a Cossack Horse Artillery Battery, marched from Gregoriopol to Odessa—112 miles—in three days. Weather boisterous, and amid drifting snow.

(3) In Egypt, 1882, General Drury-Lowe, with the Cavalry Division, marched from Belbeis to Cairo—35 miles over deep sand—on 14th September, between 5 A.M. and 4 P.M.

Infantry, particularly if accompanied by field artillery, cannot move with such rapidity. But in small bodies these arms have marched 30 to 35 miles daily for several days in succession.

An example of this is furnished by the march of the Russian General Suvoroff from Lublin to Stolovitchi in the Polish war of 1770. With a detachment consisting of 6 companies, 3 squadrons, and 2 guns—in all, 1,000 men—Suvoroff accomplished 165 miles in 5 days. On reaching Stolovitchi at night he at once attacked the enemy and routed him.

Generally speaking, the length of a forced march

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depends mainly on the quality of the troops; the fresher they are and the more confidence they have in their leader, the more capable are they of enduring fatigue and privation, and of accomplishing long marches.

Before attempting a forced march it must be distinctly shown that such is absolutely necessary. Then let it be made with energy, and let the troops be eased in every way: by selecting the best roads, giving them good shelter, abundant food, and carrying their knapsacks. It should always be remembered that nature imposes on the strength of man and horse limits which cannot be overstepped without great risk.

Other means for accelerating march:

The march of troops may also be accelerated by mounting the infantry on animals or in carts, or by using railroads.

(1) Carts.

Carts or waggons may be used for transporting comparatively small forces in a populated and friendly country when a sufficient number of vehicles is procurable beforehand.

They may be employed for the transport of the men or of their knapsacks. In the first case, if all the men are to be carried, marches of 35 to 40, or even 45 miles per day may be made, provided food is prepared beforehand for the men, and food for, or a change of, horses. If it is impossible to procure so large a number of carts, let a cart be told off for a certain number of men, and let them have their packs carried, and take it in turns to ride. A distance of 30 to 40 miles may be accomplished in the day, with the same proviso as to food. Lastly, if the men's packs only be carried, the rate of march will be about 3 miles an hour, or 25 to 35 miles in the day.

This mode of transport was frequently employed at one time for the rapid concentration of large bodies, or for reinforcing the troops in another theatre of war.

In 1806 the French Guard was transported from Paris to Mainz in 5 days, and thence to Bamberg in 8 days; that is to say, a distance of 435 miles in 13 days—about 33 miles a day. The number of carts employed was such that half the men rode, while the other half marched.

(2) Railways.

In the present day carts have yielded to railways* for

* With respect to the use of railways for accelerating the march of troops, *see* Chapter VIII.

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large bodies, but for detachments carts were frequently employed in the campaigns of 1866 and 1870, and might still find application in India and the Colonies, as they have done in the past.

Thus during the Mutiny of 1857–8, General Nicholson pursued the Sialkot mutineers in the middle of the hot weather, carrying the Europeans on "ekkahs," and eventually destroying the enemy on the Trimmu Ghât. An "ekkah" carries 2 men, their arms, 100 rounds of ammunition, greatcoats and valises, and a week's provisions. It can pass over any country track at the rate of 20 to 40 miles a day.

B.—Marches within Striking Distance of the Enemy.

We have seen in the first part of our subject that in the movements of troops beyond striking distance of the enemy, the comfort of the men and administrative interests are allowed to prevail, but when the enemy is near—within striking distance—these considerations must give way to measures which provide security from unexpected encounter, secrecy, and constant readiness for battle.

When the enemy is near, it is plain that attention must be chiefly directed to finding out his whereabouts, discovering his intentions, and, on the other hand, veiling our own position and designs. The order of march, too, must be such that, whenever it becomes necessary to fight the enemy, the troops can readily and quickly form for battle. As, however, this constant state of readiness is very fatiguing for troops, measures at the same time should be taken, as far as possible, for sparing them and husbanding their strength.

The means for attaining these objects are:—

(1) The distribution of the troops in two principal parts, namely, the covering body (advanced guard, rear guard, flank guard, as the case may be), and the main body.

(2) Moving the troops in several columns, and as much concentrated as possible.

(3) Secrecy and rapidity—unexpectedness—which is the best means for preparing success in all operations of war.

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Our subject, therefore, may be conveniently divided for examination as follows:—

(1) Order of march, *i.e.*, the size, composition, and formation of the columns.

(2) Measures for security and reconnoitring.

(3) Arrangement of marches, rate of march and order of execution from night-halt to night-halt.

(4) Measures for concealing the march.

(5) The combination of marches.

Let us now see how these questions may be solved in carrying out the various kinds of marches: offensive, in retreat, flank, and night.

Offensive Movements.

1. Order of March.

Main Body.—The first object of an offensive movement is to lead the troops to the enemy in order to fight him. To attain this object and to fulfil the conditions necessary for success of a march generally, the main body should be as much concentrated as possible, so that no time may be lost in forming order of battle.

Size of columns. Movement o long columns inconvenient and delays concentration for battle.

Now the movement of large bodies in one column is very inconvenient as regards readiness for forming order of battle, rapidity of march, and an equalised movement.

If, for example, the marching column consists of a Division of Infantry with its regiment of Cavalry, Divisional Artillery, Company of Engineers, and part of the Bearer Company—the fighting units—it will, if formed in one column, occupy $3\frac{3}{4}$ miles of road; besides these—the non-combatant units—the Commissariat Department, Ammunition Reserve, and Field Hospitals would occupy another mile of road. To these numbers must be added the distance of the advanced guard from the main body—say 1 mile; and the distance of the train from the tail of the column—say 1 mile. (See Table, pp. 98 and 144–5.)

So that for the deployment of a Division marching in a single column upon the advanced guard, about $1\frac{1}{2}$ hours are required; while for the concentration of the Division, *i.e.*, the troops and their transport, for bivouac at the night halt, not less than $2\frac{1}{2}$ hours are required.

The fighting part of an Army Corps of three Divisions of Infantry, Cavalry Brigade, Artillery, Engineers, and so

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forth, occupies in a single column 14¾ miles; the trains, &c., cover another 13 miles of road. (See Table, p. 146.)

For the deployment of such a column of an Army Corps in order of battle, at least 7 hours are necessary, while the complete concentration of the Corps for the night-halt demands not less than 13 hours. It must be remembered also that an order will take ¾ hour to reach the rear of the Corps.

If, then, under these conditions the whole army—say of four Corps—is marched in one long column, it is evident, irrespective of the difficulties of supply, that the troops could not be concentrated for fighting under three days from the time of issue of the order.

Desirable to break up a large force into several columns.

To move, then, large bodies of troops in one column is no concentration of force, but the contrary; and it is therefore desirable to divide a large force into two, three, or more columns, marching by different roads, preserving an even front, and at such distance apart as to be capable of affording one another mutual support, and of being quickly concentrated for battle.

Columns should not exceed 30,000 men.

It may be taken as a general principle that the strength of a column should not exceed 20,000 to 30,000 men. If we refer to the distances occupied on the march by an Army Corps, we shall find that, in order to have time to form before the arrival of the enemy, these figures should not be exceeded.

With the large bodies of troops composing modern armies, and the increased trains, if the whole force cannot be moved on one front, then the Army Corps in second line may be allowed to follow at an interval of one or two days. This was the German practice in 1870. Each Army Corps was generally assigned a separate road, and if this was not practicable, the second Corps on the same road followed at the interval of a day's march.

The "marching area."

Thus the first points to be decided in an offensive movement are:—Into how many columns a given force should be divided, and what should be the greatest number of troops in one column; in other words, what is the greatest permissible *extent of front and depth of what may be called the marching area*, or in other words the area over which the troops may be safely spread?

This question cannot be decided by any invariable rule, as its solution depends on a variety of circumstances.

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Theoretically, it is desirable that *the breadth of the marching area should equal its depth*, as then the assembly of all the troops at the desired point of the front can be effected more quickly than from a broader or deeper area. In practice, the solution depends on the conditions of quartering and supply, on the development and state of the network of communications, the distance of the enemy, and the number of our troops.

The greater the number of convenient roads available and the less the interval between them, the smaller the area of movement. On the other hand, with roads few in number and at wide intervals apart, we must either move the troops on a broad front or extend them in depth.

In some parts of the Continent, in the East generally, and in the Colonies, where the country is not intersected by hedgerows, banks, and ditches, it is often possible to march part of the force alongside the road, and send the cavalry across country. Thus infantry and cavalry may march off the road, which is left for the guns and the transport. This was constantly done by the Prussians in 1866 and 1870, especially before a collision. In this way the depth of the area may be considerably reduced.

In any case our calculations must be made on the principle that the enemy must never be able to strike us before we are formed to receive him.

Hence it is clear that the more distant the enemy, the greater the latitude as regards selection of roads for convenience of quartering and supply; while the nearer the enemy, the more must these considerations give place to the concentration of the troops.

The stronger and more independent the columns, the greater the distance permissible between them, and consequently the broader may be the front compared with the depth.

From what has been said the following data may be deduced:— Data as to size of columns.

Small separate detachments of strength less than an Infantry Division can conveniently move in a single column, as they occupy but little depth and can quickly deploy for battle.

A Division, as a rule, should not be distributed in two or more columns, for the Commander can only control effectively what he has in his column. To divide it into

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two columns of mixed brigades, as is sometimes seen, is liable to endanger the integrity of the Division as a fighting unit.

A single column of more than one Division is clumsy in movement and deployment; nevertheless, circumstances may necessitate the movement of an Army Corps, or more than one Army Corps, along a single road.

For instance, in the march of the 2nd German Army through the Palatinate in July, 1870, three Corps used the same road through the defile between Kaiserslautern and Homburg—23 miles long. In this case the heavy baggage and train of each corps followed in rear of the whole of the combatant troops, and in the same sequence as the corps. All three corps passed in one day, the trains following on the next.

Their distances apart.

Some French writers recommend that, in the case of a Division moving in two columns, these should not be more than 2 miles apart; in the case of an Army Corps of two Divisions, in two columns, they should not be more than 5 or 7 miles apart.* If further apart, the exercise of command becomes difficult, and the troops on one flank cannot arrive in good time at the other.

Again, in the case of large armies, if the force consists of 3 or 4 corps, moving in three or four columns, it may occupy a front of 14 to 20 miles, and the same in depth.

Example 1. The 3rd German Army in 1870, consisting of four Army Corps, the Württemberg Division, and a cavalry division, crossed the Vosges on a front of about 23 miles.

Example 2. The slowness of movement of Marshal MacMahon's force from Rheims to the Meuse at the end of August, 1870, is explained by the circumstance that 4 strong Army Corps were moving in two columns.

Colonels Fourgeot and Lagrange† estimate that the front of an army on the march may, without inconvenience, occupy once and a half its front in battle, since in taking up a position the intervals can be closed before the enemy can profit by them. This distance may be doubled, or tripled, when the enemy is not in close proximity.

It must, however, be remarked that the dimensions of the area for large armies depend not only on the above-mentioned circumstance, but on many other conditions.

The intelligent application of the maxim, "Separate for

* Some German writers say not more than 4½ miles apart when an enemy is near.

† Belgian Staff.

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marching, unite for battle," demands a clear comprehension of the enemy's measures, an eye for ground, and a thorough appreciation of the circumstances, in order to be, amid the changing circumstances of war, at the right place at the right moment. To be united too soon hampers the movements; to be too late may lead to defeat in detail.

Example. On the day of Gross-Beeren, during the march to Berlin (1813), Oudinot's columns were too far apart to afford mutual support, and were separated by obstacles. Hence the defeat of part of the army, and the failure of the operations.

Junction of columns may now take place on the battle-field.

The experience of recent wars tends to show that the junction of the columns takes place more often *in* than *before* the battle. The circumstance that this can be done without danger may be attributed to the increased power of modern weapons, especially behind cover, enabling the troops which first arrive to hold their ground longer, even against a superior force.

Network of roads influences the marching area.

From what has preceded, it will be apparent that the state of the *network of roads* exercises great influence on the front and depth of the columns.

Selection of roads important.

Hence an attentive examination of the position and condition of the roads leading in the direction of the contemplated march, and a judicious selection for the purpose in view are of great importance.

Conditions they must fulfil.

Roads should fulfil the following conditions:—

(1) Each should be fitted for the march of all arms.

(2) The direction should be approximately parallel. Roads which intersect should be avoided; if impossible to avoid these, precautionary measures should be taken to obviate crossing of the columns and consequent delays.

(3) Distances between roads should not be so great as to imperil one column before the others can come to its support.

(4) The intermediate country must not impede the mutual support of columns; the greater the number of transverse roads the better.

When the roads are thus selected for the main body, and, in accordance with the number and state of these roads and the other conditions, the breadth and depth of the marching area are determined, the Commander is able

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to proceed to the consideration of the *distribution of the troops in the columns.*

Composition of the columns.

This distribution must be determined by (1) the position of the adversary, and, if near, the operations contemplated for his discomfiture; (2) the nature of each road and of the locality through which it passes; and (3) the number and composition of our force.

Each column must possess a certain degree of self-dependence, and, therefore, must consist of all three arms, and be sufficiently strong, that if encountered singly it may hold its own until the arrival of the neighbouring columns. At the same time, if it is proposed in some particular direction to employ especially strong forces, or to move a large force of artillery or cavalry, then the columns moving in that direction are strengthened generally, or with that particular arm intended to preponderate.

The better the road, the larger the body of troops that can be directed along it; the worse the road, the smaller the body. If a road passes through close and intersected country, the columns taking that road should have less cavalry than under ordinary conditions; on the other hand, if the country is level and open, that column should have more cavalry. While sometimes, in such cases, the columns may consist merely of cavalry and horse artillery, especially if the object be to turn a flank, or operate on the communications of the enemy.

Avoid breaking up units.

In distributing the troops to the columns it is always desirable to avoid any unnecessary breaking up of the units. Each column should consist of complete units—Corps, Divisions, and so forth.

Marching by Corps or Divisions is the most usual, as those units are tactically complete with a proportion of the three arms and with administrative units for supply, ammunition, and hospitals. Breaking up a Division to march by two roads is not desirable for reasons already given.

Order of march.

The succession in which the different units and arms should march is usually left to the discretion of the commander of the column. A faulty distribution will lead to evil results, particularly if the column be deep, in the event of the enemy being encountered.

(1) Combatant troops.

This succession, or, as it is called, *the order of march* of

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the troops, depends on the probable course of operations and the character of the locality. If the locality is level, open, and not very intersected, cavalry and light field artillery should form the head of the column, as, in such ground, these arms can most quickly give support to the advanced guard or neighbouring columns, and can quickly get out of the way of the other troops. In thickly wooded, mbuntainous, or intersected ground, where the locality is unfavourable to cavalry, infantry, with field artillery, should head the column. But even in these cases it is necessary to have a small detachment of cavalry near the head of the column for patrolling, carrying messages, and so forth.

When there is no fear of an immediate encounter with the enemy, cavalry, no matter the ground, may be allowed to leave the halting-place after the infantry, whom they overtake. It is disadvantageous to place cavalry between bodies of infantry, as from its possessing greater rapidity of movement it is impeded by the infantry.

Artillery should be placed among the troops of its Division and as near the head as possible, for on meeting the enemy its fire is urgently required. At the very head of the column it is desirable to place some other arm—cavalry or infantry, as artillery must not be liable to surprise. For the same reason it is a rule never to let artillery march for long distances separate from the other arms.

When moving through a defile or other locality not allowing of the deployment of large bodies of artillery, it would be manifestly injudicious, if not dangerous, to concentrate a large number of guns in front; while in mountainous or bad ground, it might be not only desirable but necessary to distribute the batteries throughout the columns, in order that they might be helped along by the cavalry and infantry.

Behind the artillery come the rest of the infantry and any other details such as the engineer company. As a rule, however, the best place for the engineers is with the advanced guard, where they will be at hand for repairing roads or bridges, removing obstacles, and also for any duties that may be required at the bivouac or night-halt.

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The normal order of march of a Division is shown on the plan facing page 100.

An army corps marching by one road has usually one division at the head; then the corps artillery; and then the remainder of the corps. If an action is imminent, the corps artillery might be placed among the regiments of the leading brigade of the main body. If an independent advanced guard is required, the leading Division would form an advanced guard of its leading brigade.

If not in close proximity to the enemy, the Divisions in rear may study the convenience of the troops.* For instance, the whole of the artillery escorted by what cavalry may be available may be placed at the head, while the infantry follows in its *ordre de bataille* formation. In this way the cavalry and artillery, which move quicker than the infantry, can go on at their own pace until they touch the tail of the Division in front, when they halt until their own infantry arrives. The only measure of security which may be necessary is to throw out flanking detachments. If there is a certainty of battle, however, the Divisions marching in rear must adopt an order of march which favours their subsequent deployment for battle.

When the Divisions march by separate roads, their commanders determine the order of march of their Divisions, each taking their own measures of security. The corps artillery in this case generally marches with the Division moving by the best road, and is placed either between the brigades of that Division or else follows at its tail. The corps commander will, as a rule, march by the road where the corps artillery is, and at the head of the Division.

As most battles in the present day occur during the forward march of the two opposed armies, it follows as a general principle that, in determining the order of march, everything should be arranged in the sequence in which it is likely to be required for fighting. First, the combatant troops and their immediate requirements on the battle-field —tools, reserves of ammunition for day's use, and ambu-

* In such cases it may be sometimes permissible, when the enemy is at a distance, to divide the troops into echelons following one another at a distance of a mile or so apart. The troops then bivouac separately and continue the march in the same order next day. This arrangement prevents all delay at the start.

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lances—and then the non-combatant train, &c., arranged in echelons and at sufficient distances in rear not to encumber the column by their immediate presence, but ready to be brought up when required.

The proper distribution of the train is *the* difficulty on a march, and cannot have too much attention. (See Chapter VI.) (2) Trains and baggage.

The best escort for the train is a well-arranged order of march and good reconnoitring. It must be remembered that every soldier employed on escort or any other duty than fighting is a loss of power.

As illustrations of the ill effects of having the heavy trains mixed up with the fighting troops the following examples may be cited :—

Example 1. March of 3rd and 4th French Corps at the commencement of the battle of Magenta, 1859.

Example 2. March of 7th French Corps during the Sedan operations on 29th August, 1870, when the whole column of 1,500 wagons fell into German hands.

Example 3. March of 2nd Bavarian Corps at the battle of Beaumont on 30th August, 1870. A column of wagons nearly 9 miles long encumbered the troops.

Example 4. Bazaine's retreat from Metz upon Verdun was hampered by the mass of trains encumbering the roads, thereby enabling the Germans to interpose their forces on his line of retreat.

As regards the command and general arrangement of the baggage on the march in our service, the practice is to have a Divisional Baggage-Master and a Baggage-Master for each Brigade; the Divisional Baggage-Master receiving orders from, and reporting to the Quartermaster General's Staff every day. He, in turn, gives the necessary orders to the train.

The Baggage-Master exercises general superintendence over the baggage columns during the march, prevents any unnecessary halts, delays, and openings out, but the actual protection forms the duty of the officer commanding the troops assigned as escort.

In rear of the train follows the rearguard. Generally speaking the rearguard, during an offensive movement, looks after the order of the rear of the column, and picks up stragglers or sick men ;* but when troops are moving Rearguard.

* For this purpose it should have with it some sick carriage, and a Medical Officer.

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through a district where the population is hostile, the rearguard may have to defend the train and generally the rear of the column from the attacks of the armed population.

In the first case the rearguard is small and is composed of infantry or cavalry; in the second case it should be strong and composed of all arms.

In certain cases where the population is exceedingly hostile and the country destitute of supplies (Afghanistan, Central Asia, &c.), where the capture of the train by the enemy would entail the annihilation of the force, there is no safety but in habitual watchfulness. The strength of the troops in rear of the column in such cases should not be less than at the head. The march should be protected by strong advanced, rear, flank, and baggage guards, with on outside fringe of patrols all round, forming, as it were, movable outposts to the marching columns. In the plains this outside fringe would consist of cavalry; in the hills of infantry. The whole force, in fact, acts as escort to the train.

Distances between units on the march:

Before leaving this part of the subject, a few words must be said on the spaces purposely left between troops on the line of march and those which involuntarily occur owing to the opening out.

(1) Spaces left purposely.

The spaces purposely left have for their object the absorption of such openings, and of preventing the irregularities which may occur in one part of the column from being reflected to other parts, and also to admit circulation of air into the column.

For rapid concentration it is of course desirable that the depth of the column, and consequently the spaces between the units, should be at a minimum; on the other hand, for convenience of movement and the maintenance of regularity, it is more advantageous to have the distances large.

The distances allowed in our service are not precisely fixed, but under ordinary circumstances the following are allowed :—

30 yards between battalions or batteries; 10 to 20 yards between squadrons; and 50 yards between cavalry regiments.

The distances with foreign armies are usually as follows: —After companies, 10 paces; after a battalion, squadron, battery, or ammunition column, 20 paces; after an infantry

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regiment, cavalry regiment, artillery division, train division, 40 paces; after infantry brigade or cavalry brigade, 80 paces; after Division, 300 paces. (In Russia these distances are more than doubled.)

(2) Involuntary spaces.

The amount to which troops open out on the march—the involuntary distances—will depend in a great measure on their discipline and the care and attention of their officers. In our service one-third more than the estimated length of the column is allowed. The French writer, General Leval, gives also one-third as the minimum allowance. General Berthaut says it sometimes amounts to two-thirds of the normal length of the column.

Ordinary formation of troops.

Ordinary roads met with in civilised countries usually admit of infantry in fours, cavalry in sections, guns and wagons in column of route.

Calculation of depth of units.

Hence, in calculating the depth a body of troops will occupy on the line of march, the following data will be useful for remembrance:—

Infantry in fours, length equal front in line; cavalry in sections, twice length of front; guns and wagons, 12 yards for 2 horse, 16 for 4 horse, and 20 for 6 horse (including 4 yards distance).

Rough practical rule: 1 yard for each cavalry soldier, or 2 infantry, and 20 yards for gun or wagon.

The following table shows the depth of column occupied by the various units, which will be useful in estimating the depth of any given body of troops. The involuntary distances are not included.

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Length of Road occupied by Troops on the March.
(Tents not carried.)

Unit.	A Length of Fighting Column, including Reserve Ammunition, Tools, and 1st Line Bearer Company.	B Length of remaining Regimental Transport and 2nd Line Bearer Company.	C Total of A and B.	D Depth of Administrative Departments and Trains.	E Total of C and D.	Remarks.
Infantry Battalion (850 r. & f.), in fours.	390	140	530	...	...	N.B.–In these calculations no allowance is made for involuntary spaces. Neither is any allowance made for advanced or rear guards. *Including Brigade Commissariat.
Infantry Brigade (3 battalions with distances).	1,250	432	1,682	172*	1,854	
Cavalry Regiment, in sections.	506	160	666	...	...	
,, Brigade (3 regiments and H.A. battery).	2,116	492	2,608	300*	2,908	
Artillery.—Horse Artillery battery.	300	88	388	...	...	
Artillery.—9-pr. or 13-pr. Field	252	84	336	...	...	
,, 16-pr. Field ...	300	88	388	...	...	
Divisional Artillery, 3 batteries	924	260	1,184	...	...	
Corps Artillery, 5 batteries ...	1,640	452	2,092	...	...	
Divisional Ammunition Reserve	...	...	...	876	...	
Corps Ammunition Reserve, 3 sections.	...	...	...	1,680	...	
Engineers.—Field Company ...	168	...	...	...	...	
,, ,, Park ...	160	...	...	...	...	
,, Pontoon Troop ...	...	...	...	660	...	
,, Telegraph Division	...	...	...	324	...	
Medical.—Bearer Company ...	260	276	536	...	...	
,, Field Hospital ...	...	...	...	196	...	
Commissariat—						
Divisional, 1st Line	...	...	...	348	...	
,, 2nd Line... ...	...	...	...	520	...	
Corps Details, 1st Line ...	...	...	...	500	...	
,, 2nd Line ...	...	...	...	600	...	
Bakery Train	...	...	...	868	...	
Ordnance Store Department (Army Corps).	...	...	...	560	...	
Divisional Police	...	...	...	100	...	
Infantry Division	4,873	1,700	6,573	1,604	8,177	

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2. Measures for Security and Reconnoitring.

Advanced Guard.

A force marching to encounter the enemy always throws out to the front a body of troops in light order as feelers; in many cases it forms a special advanced guard composed of the different arms. It always gives this mixed character when the covering body has to fight, *e.g.*, in a retreat or a flank march, for in these cases the covering body has to hold the foe in check while the main body continues its march. Covering body always necessary,

The experience of recent warfare tends to show that, except in the circumstances above mentioned, the mixed advanced guard should have little or no infantry, as when infantry is once launched into the fight there is difficulty in withdrawing it. As long as cavalry and artillery are alone committed, the fight can be speedily stopped, but this is not the case with infantry. The danger is that the Commander of the advanced guard may, by mistaken views as to the situation, or by the desire of personal distinction, bring on an undesired action, or one for his own benefit. The Divisional Commander should be the sole judge as to the proceedings to be adopted with regard to the enemy. Hence, recent military writers recommend that in ordinary cases the advanced guard should have the least amount of infantry consistent with the duties it has to perform. They consider that one battalion suffices for most cases, as it is adequate to dispose of feigned attacks, and yet not large enough to induce the Commander of the advanced guard to try conclusions on his own account. So that in ordinary offensive movements, when the cavalry in front gives the required security against surprise, no special distribution need be made. In the case of a Division, for instance, the 3 squadrons of cavalry would be well in advance, and a battalion might be $\frac{3}{4}$ mile in front of the column, with its vanguard thrown out. But if for any reason the cavalry cannot carry out the duties of security efficiently, or if some important point has to be seized and held, then it becomes necessary to form a mixed advanced guard, to have it moderately strong in infantry, so as to be able to hold the but its composition varies.

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enemy in check before that position until the arrival of the main body.

This detention until the arrival of the main body is often a matter of difficulty if the enemy is in force and attacks vigorously; hence, in order to gain as much time as possible, it is desirable to push the cavalry well to the front, so that early intimation of the enemy's approach may be furnished, and time given to occupy a favourable position. In many cases the unlimbering of some guns, which by their brisk fire force the enemy to deploy, is a better means of securing this necessary time than a large body of infantry in the advanced guard.

The same principle holds good in the case of an Army Corps moving by one road. The leading Division is entrusted with the security of the march, and if the cavalry in front can do its duty, there is no special necessity for forming a mixed advanced guard. But if the cavalry in front cannot for any reason perform its duties of security, or a fight is certain, then a special advanced guard of all arms becomes necessary.

Flanking detachments.

In an advance or retreat a flank Division or a body of troops moving independently may require to guard its flank. If the cavalry flankers or a cavalry squadron cannot do this effectually, a mixed flanking detachment should be detailed from the main body, and move abreast of the latter for its protection. Such flanking detachment would consist of all arms, and in the case of a Division might be composed of a battalion, a squadron, and 2 guns, or more, according to circumstances. It would accompany the march on a parallel road, and take measures for its own security in front and on the endangered side by patrols, and at the same time maintain communication with the advanced guard. The advanced guard would, at the same time, guard its own flank.

Mixed advanced guard for a Division.

In the case of a British Division forming a special mixed advanced guard, the normal composition might be:—

Two Battalions, 3 Squadrons, 1 Battery, 1 Engineer Company (with pontoon train, if necessary), ½ Bearer Company, as shown in the drawings facing pp. 110 and 111. Such a strength would be in keeping with the general arrangements of continental nations. (Table on p. 101, and sketch facing p. 101.)

On the drawing opposite is shown a normal order

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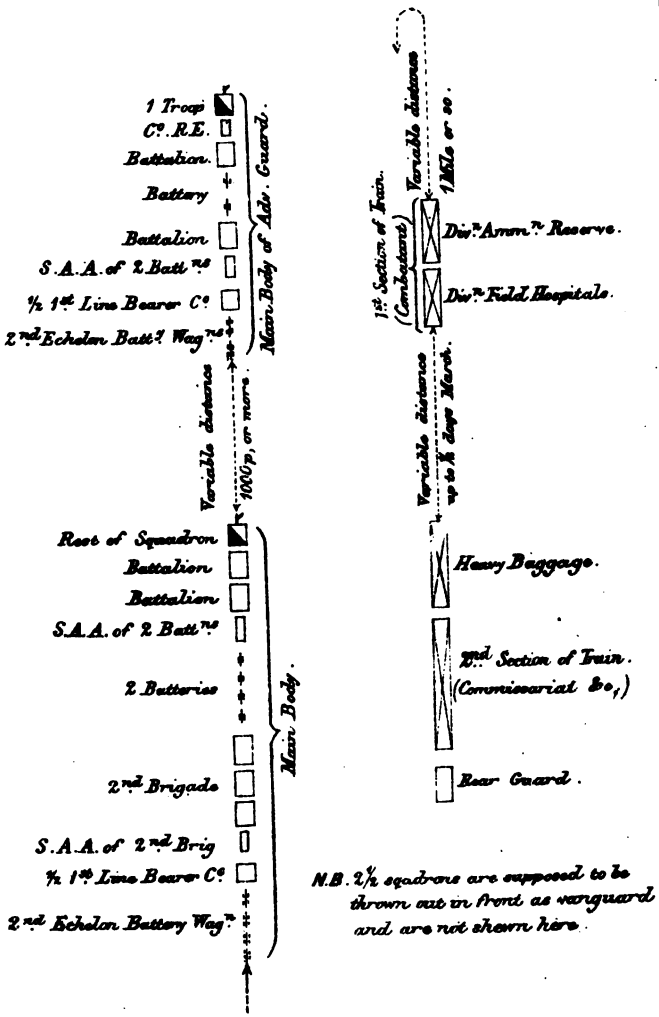
face p. 100.

ORDER OF MARCH OF A DIVISION.

(ENEMY WITHIN STRIKING DISTANCE.)



N.B. 2½ squadrons are supposed to be thrown out in front as vanguard and are not shewn here.

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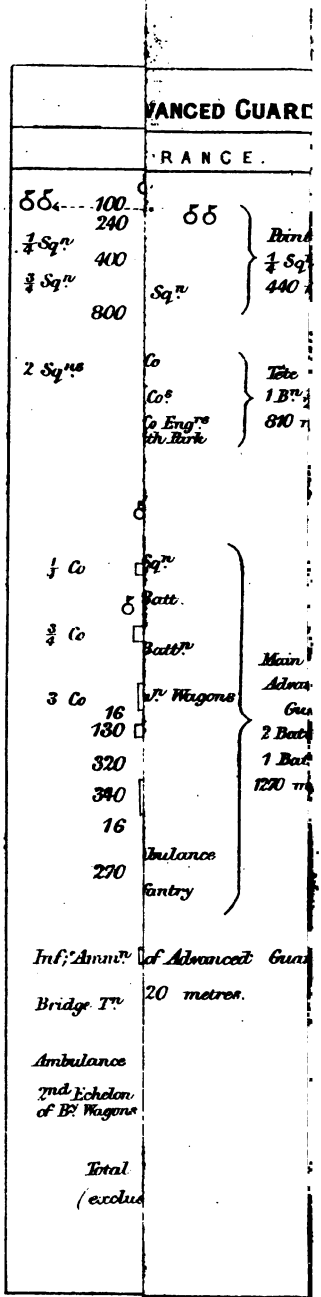

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Typical Order of March of an Infantry Division within Striking Distance of the Enemy in Foreign Armies.

GERMANY.	AUSTRIA.	FRANCE.	RUSSIA.	ITALY.
Composition of Advanced Guard.				
3 Battalions (1st Regiment). 3 Squadrons. 1 Battery. 1 Pioneer Company (and Bridge Train, if necessary). 1 Sanitary Section. Light Baggage (S. A. A. Wagons, &c.). Led Horses.	3 Battalions (1st Regiment). 2 Squadrons. 1 Battery. ½ Engineer Company. 1 Pioneer Division. 1 Ambulance. Fighting Train of Advanced Guard.*	3 Battalions (1st Regiment). ½ to 2 Squadrons (from Cavalry Brigade). 1 to 2 Batteries. ½ Engineer Company with Park. 1 Ambulance Detachment. Fighting Train of Advanced Guard.¶	4 Battalions (1st Regiment). 1 Regiment Cavalry. 1 to 2 Batteries. 1st Echelon of Regimental Train (Commissariat Carts, Ambulances, Reserve Carriages).	3 Battalions (1st Regiment). 1 Squadron. 1 Battery. Light Baggage (Ambulances, Commissariat Wagons, Ammunition, and Store Wagons).
Distance of Advanced Guard from Main Body.				
1,600 to 2,500 Metres.	1,800 Metres.	3,000 Metres.	7,000 Metres.	1,500 Metres.
1 Squadron. 2nd Regiment 3 Batteries 2nd Infantry Brigade. 1 Pioneer Company. 1 Sanitary Section. 2nd Echelon of Battery Wagons of Main Body. Light Baggage of Main Body. (2,000 paces distance.) Heavy Baggage. (4 or 5 miles distance.) 1st Echelon of Trains. (Day's march distance.) 2nd Echelon of Trains.	½ Engineer Company. 1 Battalion (2nd Regiment). 2 Batteries. 2 Battalions (2nd Regiment). Rifle Battalion. Ammunition Wagons. 2nd Infantry Brigade Ammunition Wagons. (500 paces distance.) Fighting Train.* Divisional Ambulance. Divisional Ammunition Park. Staff and Troops Wagons. (500 paces distance.) Baggage Train.† (500 paces distance.) Commissariat Train. Rear Guard.	½ Squadron to 1½ Squadrons. 1 Battalion (2nd Regiment). 3 Batteries. 2 Battalions (2nd Regiment). 2nd Infantry Brigade. (100 metres distance.) Rest of Ambulance. Artillery and Infantry Ammunition Section. Fighting Train of Main Body. (800 metres distance.) Rear Guard. (2 to 10 kilometres distance.) Regimental Train.‡ (Variable distance.) Convoi Administratif des Subsistances.	Cossack Sotnias. 1 Battalion (2nd Regiment). 2 to 1 Batteries. 3 Battalions (2nd Regiment). 3 Batteries. 4th Infantry Regiment. 1st Echelon of Regimental Train. (3 to 10 kilometres distance.) 2nd Echelon of Troop Train.§ Rear Guard. (1 to 3 days' march distance.) Divisional Ammunition Park. Divisional Field Hospital. Intendance Transport.	1 Squadron. 2nd Infantry Regiment. 2 Batteries. 2nd Infantry Brigade. Ambulance Section. Divisional Artillery Park. Light Baggage of Main Body. (1,000 metres distance.) Heavy Baggage (Carreggio). Rear Guard.

* Fighting Train—Led Horses, Ammunition, Suttlers, Artillery, and Engineer Store Wagons; so much of Divisional and Ammunition Park as is required on Battle-field (rest with Baggage Train).
† Baggage Train—Baggage, Commissariat Wagons, Live Cattle.
‡ Regimental Train—Baggage, Food, Suttlers, and Reserve Clothing Wagons.
§ Ammunition, Commissariat and Baggage Wagons.
¶ Entrenching Tools and Ammunition Wagons.

N.B.—Divisions in foreign armies differ in composition from a British Division.

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of march for a Division furnishing its own mixed advanced guard as a covering body, but it must be considered in the light of a general arrangement, not to be invariably followed, but to be altered to suit the nature of the country, the circumstances of the moment, and the proximity and character of the enemy. (See also pp. 197–198.)

Distance between parts.

The distances between the different parts of the advanced guard, and between the latter and the main body, and between the main body and the train will, of course, depend on the varying circumstances of each case.

Sequence of troops.

As regards the sequence of the troops on the march, the cavalry, as already mentioned, is usually despatched in advance. Next comes the arm which is required to open the struggle—the artillery. But lest the cavalry be overthrown and the pursuing enemy fall on the defenceless batteries, it is the custom to place at least some infantry in front of the guns. Too much artillery must not be put in front, otherwise the infantry will arrive too late.

Let us first consider the cavalry.

Cavalry Division in front of Army is divided into:

The general principles to be observed in distributing the Cavalry Division for reconnoitring in front of the Army are as follows:—

The Cavalry Division should be divided into two portions—(1) the reconnoitring troops; and (2) the fighting reserves.

(1) Reconnoitring troops.

The reconnoitring troops being intended to find out and gain intelligence of the enemy, need only be sufficiently strong to explore the communications and the intervening ground.

(2) Fighting Reserves.

The fighting reserves, being intended to support the reconnoitring troops on the latter meeting the enemy, should be held as concentrated as possible, in order to ensure success at the point where they may be required.

The reserve which a body of cavalry can keep in hand may be considered at about one-half, but this figure is, in practice, dependent on the breadth of the zone to be reconnoitred, and its depth, or, in other words, the distance separating it from the heads of those marching columns of the main force which it is covering.

Extent of zone to be reconnoitred.

The breadth of the zone is naturally variable. It is usually more extensive than the front occupied by the marching columns, and is determined by the Commander-in-Chief according to the circumstances. The breadth, if

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considerable, would be divided into sections, and these sections assigned to separate Cavalry Divisions, &c., the distribution being such that the foremost bodies or patrols in each section shall receive all orders the day they are given, and that all reports from the patrols not only reach the Head Quarters of the respective Cavalry Divisions, but also the Commander-in-Chief, on the same day. Besides this the reconnoitring cavalry must not be distributed over an area too wide for its reserves to reach in good time any point of it which may be seriously threatened.

According to the experience of the war of 1870–71, a German Cavalry Division* distributed over an area of 20 to 25 miles in breadth, and 6 to 10 miles in depth, according to the ground and the state of the roads, is thoroughly in hand with respect to command, reports, and supervision.

Next, as regards power of resistance. The experience of the same campaign shows that a squadron can cover $2\frac{1}{2}$ to $4\frac{1}{2}$ miles of ground in width, giving a liberal allowance of patrols and maintaining proper communication. So that assuming the same proportion for the fighting reserve as for the reconnoitring force, a regiment of 4 squadrons would hold their ground in a breadth of 5 to 9 miles; therefore, a British Cavalry Brigade of 3 regiments (12 squadrons) over 15 to 27 miles. A British Cavalry Division of 24 squadrons could consequently cover well the ground indicated as the maximum consistent with convenience of command, and have a large margin for subsidiary purposes.

Distance from marching columns in rear.

As regards the distance from the marching columns in rear, this will depend more particularly upon the nature of the ground on the flanks—whether it lends itself to outflanking movements on the part of the enemy—and upon the number, movements, and spirit of enterprise of the enemy's cavalry.

In its forward movement the reconnoiting cavalry should concern itself solely with its special duty of scouting and maintaining a complete chain of communication between the feelers and the fighting reserve. If anything else of a special nature has to be done, such as a reconnaissance in force, the occupation of important points in front or on the flank, the threatening

* Of six regiments.

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of the enemy's flank, the destruction of the enemy's means of communication, &c., separate raiding detachments should be formed; while for gaining more rapid intelligence of the enemy or seeking him at a long distance, special reconnaissance patrols under officers must be despatched.

With regard to these special duties it may be observed that after receiving instructions as to the object of their mission and the time of their absence from Head Quarters, the leader is accorded full liberty of action as regards the execution.

Procedure of the Officer Commanding the Cavalry Division.

The Cavalry Division Commander would receive instructions or general directions from Army Head Quarters which, according to the circumstances, might include a period extending over several days, or merely from one position to another, *e.g.*, from one river line to the next. The instructions should embrace the following points:—

Nature of his instructions from Army Head Quarters.

(1) News of the enemy's position and movements (to be supplemented from day to day, as intelligence may come in); the Commander-in-Chief's intentions; the direction of movement of the cavalry as a whole, and of the Divisions in particular.

(2) The daily halting-places of the heads of the main columns and of Army Head Quarters.

(3) Arrangements as to supplies.

(4) Points to be seized or destroyed.

From these directions the Commander of the Division will decide whether the touch of the enemy is to be gained by special reconnaissance patrols, or whether by the ordinary forward progress of the Division. If in the ordinary way, he would allow a zone of 2½ to 4½ miles breadth to each squadron in first line, and keep the rest as a general reserve about 5 or 6 miles in rear.

His own orders.

His orders would be issued daily, and should include the following points:—

(*a*) For the squadrons in first line: the general task and mode of accomplishing it; the division of the zone into sections; the line of march and destination of each squadron; their relations to the neighbouring squadrons, to flank detachments, and to the main body of the Division; any special patrols under the command of officers, their task and time of return; the time of depar-

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ture; the mode of sending reports; arrangements as to food and reliefs.*

(*b*) For the flank detachments: their tasks in general, their procedure, their reports, food, communication, the duration of their mission, and their return to the main column.

(*c*) For the fighting reserve, with which the Cavalry Division Commander is usually present: the direction of march, order of march, destination, communication, relief, and food.

General arrangements.

When moving off from the night-halt, the squadrons in front line should be allowed to go well ahead, while the reserve does not move until the first reports from the reconnoitring squadrons have come in, and have thrown light on the general situation. But as this waiting might isolate the squadrons in first line, the main body detaches to the front a vanguard, which establishes communication with them. Reports may be transmitted through orderlies in the event of there being no means of communication by telegraph or signal, and should be shown on the road to commanders, who make a note thereon as to the time at which they saw them. Reports from the reconnoitring squadrons to the main body should be made at intervals of every 1 or 2 hours.

The baggage, hospital establishment, and commissariat train usually follow the main body at 3 to 5 miles distance, and should be reduced to the lowest limits possible, as they hamper the freedom of movement of cavalry. Requisitions should be employed to the fullest extent.

At night, the halt should be made if possible behind a good position, the reserves being brought nearer to the reconnoitring squadrons. This facilitates supply and the giving of orders. Whether the men bivouac or are quartered must depend on the propinquity of the enemy.

Procedure in Franco-German War, 1870-71.

The following were the usual arrangements of the 4th Cavalry Division, under the command of Prince Albrecht of Prussia, during the Franco-German War, 1870-1, when the main body of the Division marched in a single column.†

Along the main direction of advance was sent a strong

* Squadrons should be relieved by preference in the morning before starting.

† From "Das Leib Hus. Regt., No. 2, im Kriege, 1870-71," by Lt. Mackensen.

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officer's patrol furnished from the advanced guard brigade, and about a day's march ahead.

About half-way between this patrol and the advanced guard, and a day's march distance on the flanks moved two half-squadrons, which were relieved each day from the advanced guard brigade (the light). This brigade was itself preceded by a vanguard of 2 squadrons. Generally speaking there was no battery with the advanced guard.

The main body of the Division moved about 1 mile behind the advanced guard brigade; the lancer brigade leading, followed by the heavy brigade.

The lancer brigade despatched in advance, abreast of and on the flanks of the advanced guard, 2 squadrons at a distance of ½ day's march from the principal route. The patrols from these squadrons, as also the patrols from the different requisitioning detachments, which foraged right and left of the route in advance of their regiments, completed the screen formed by the patrols and detachments of the advanced guard: a screen which described round the head of the main body a semi-circle of a day's march radius.

At the night halt the troops were located as far as possible in close cantonments;* the advanced guard was usually in bivouac. The general assembly for the main body was fixed near the Divisional Head Quarters. The necessary security while halted was given by patrols sent out from the advanced guard and from the flanking detachments, and by smaller movable patrols detached to different points: not a system of stationary vedettes, but movable patrols sent along the main routes and to the flanks, scouting and keeping touch of each other. The main routes and most important localities were watched by the two squadrons of the vanguard, which formed the main body of the outposts.

Supplies were furnished by requisitions, detachments being sent to the different villages along the route for that purpose. These detachments consisted usually of a ½ squadron and were commanded by an officer; they scouted and requisitioned at the same time. The villages were told off to the different regiments for requisitions, those on the main route being reserved for the advanced guard.

* For explanation of this term *see* p. 154.

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Having thus described the measures for security and reconnoitring of the cavalry in front of the army, we can now consider the order of march of the units behind it. First comes the advanced guard of the main columns.

ADVANCED GUARD: Object.

The object of an advanced guard is to enable the main body to march in comfort, secrecy, and without liability to interruption; and on meeting with the enemy to change to fighting formation, without impediment and according to the circumstances.

Duties.

Consequently, the duties of the advanced guard are as follows:—

(1) To observe the enemy and give information of his strength and position, and for this purpose to reconnoitre, not only in front of the entire area, through which the main body has to pass, but as far as possible to the right and left of it.

(2) To remove local obstructions which might impede or delay the movement of the main body.

(3) To overthrow any hostile advanced troops; not allowing them to observe the main body or in any way to delay its march.

(4) On meeting with large hostile forces to engage them; in order, on the one hand, to force them to show themselves and their intentions; and, on the other, to veil our own main body, and give it time and opportunity to form for battle according to circumstances, or to carry out some other decisive movement.

Distance in front of main body.

In order to fulfil its duties, the advanced guard must be in front of the main body. It must not be too far off, or it would be endangered; connection with the main body might be lost, and, if the enemy be in superior force, it might be beaten before the arrival of reinforcements. On the other hand, if too near, the main body will be at a disadvantage, as the advanced guard will not be able to remove obstructions in time or gain early intelligence of the enemy; moreover, if met by superior hostile forces, the advanced guard might be driven back on the main body before the latter has had time to form.

Hence the least distance at which the advanced guard should precede is determined usually by the time which the main body requires to form for fighting, and this depends on the breadth and depth of the marching area,

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the condition of the roads, and the nature of the adjacent country.

If the entire body of troops does not exceed the strength of an army corps, a single advanced guard is usually sent forward, taking the best of the roads and remaining ahead at a distance varying from 2 miles to half a day's march.

But if the force consists of several army corps, then, according to circumstances, it may have separate advanced guards for each corps, and, if necessary, one general advanced guard of an entire army corps.

The advanced guard army corps, in this latter case, may be in front of the army at a distance of a whole march.

Advance of Napoleon in 1809 from Ratisbon to Vienna. His march from the Inn to the Traun in 1805; Murat followed by Soult. The advance of the 2nd German Army to the Saar at the commencement of the 1870–71 Campaign, the 4th Army Corps being in advance.

Strength. The strength of the advanced guard should be guided by the distance, at which it precedes the main body; by the position and character of the enemy; and by the immediate object it has in view.

The further the advanced guard from the main body, the stronger must it be; for example, if a whole march distant when it therefore loses immediate contact with the main body, and the possibility of support, it should be strong enough to sustain a serious engagement. If the adversary is energetic and active, the advanced guard must be stronger than if he is weak and unenterprising.

Lastly, the distance of the enemy, his intentions, and the immediate object of our operations also exercise influence. If the adversary be far off and retiring the advanced guard may be weaker than when he is near and intends to defend himself obstinately. In the latter case the advanced guard must not only be stronger, but should keep nearer to the main body than in ordinary circumstances.

From what has been said, the advanced guard may vary from $\frac{1}{6}$ to $\frac{1}{4}$, but in some cases it may be diminished to $\frac{1}{10}$ or increased to $\frac{1}{3}$ of the entire force.

Composition. The composition of the advanced guard should be suited to its object, and particularly to the nature of the country through which it has to pass.

If there is likelihood of a fight, the advanced guard should, as already mentioned, consist of all three arms.

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For protection and for reconnoitring, cavalry and horse artillery are necessary; and the more cavalry, the more easily can the advanced guard do its duty. To remove local obstructions, *i.e.*, to repair roads and bridges, to prepare means of passage, engineers are required; for decisive and independent operations on meeting the enemy, infantry and artillery are essential.

The proportion of the different arms will vary with the object. If the advanced guard has to pursue a retreating foe, it must be more mobile than when it moves to the encounter of an unbeaten enemy, who may offer a stubborn resistance. Important influence is exercised also by the nature of the country. If generally open and level, the proportion of cavalry should be greater than in close, intersected, or mountainous ground, where infantry would preponderate.

But however close and intersected the ground, the advanced guard must never be without a small force of cavalry. Being able to move well in advance, this arm finds out the enemy quickly and transmits the news. Even if driven in, its small size will not throw the troops in rear into disorder.

If there are engineers with the troops, either the whole or a large part should, as a rule, be assigned to the advanced guard; the addition thereto of the pontoons will depend on their being required or not.

In forming the advanced guard care should be taken not to break up the units unnecessarily.

Thus the strength and composition of the advanced guard varies with the circumstances. But under ordinary conditions, that is to say, average country and an enemy near, the size and composition may be assumed as follows:—

(1) A detachment consisting of a battalion, half a battery, and a squadron may, in ordinary circumstances, have the squadron as advanced guard. In close and intersected ground, or foggy weather, or in close proximity with the enemy, who is ready to fight, this detachment might send forward as advanced guard one company and half a troop.

(2) A brigade of 3 battalions, with a battery and a squadron, may, under ordinary conditions, detach as advanced guard 1 battalion and 1½ troop of cavalry;

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leaving half a troop with the main body for patrols and messages.

(3) The composition of the advanced guard of a Division has been already noticed (pp. 99–100).

(4) An army corps might have as advanced guard an infantry brigade and the rest of the divisional troops, under the command of the general of the leading Division.

(5) Independent bodies of cavalry might form advanced guards as follows:—Cavalry regiment, 1 squadron; cavalry brigade of 3 regiments and horse artillery battery, might detach independent squadrons towards the enemy, and then as advanced guard have a squadron with 2 guns, $\frac{1}{2}$ or $\frac{3}{4}$ mile ahead of the rest of the brigade and the remaining 4 guns.

The sketches facing pp. 110–111 give types of the arrangement of the advanced guard of a Division moving (1) through open, and (2) through intersected ground. The Divisional cavalry is reconnoitring ahead of the column. In ordinary circumstances, as already explained, the Cavalry Division does this for large bodies, being 2 or 3 days' march ahead. The Divisional cavalry regiment, of course, cannot undertake such distant operations; it can only extend its zone of observation so far as to be able to give timely notice of immediate danger. It however maintains communication with the Cavalry Division in front as far as possible.

Order of march of advanced guard:

The duty of the advanced guard being, as before stated, to screen and reconnoitre, to overcome every kind of obstacle (inclusive of weak detachments), and lastly, to engage considerable hostile forces, the order of march of the advanced guard should in general be as follows:—

(1) Vanguard;

The advanced guard should be divided into two principal parts: the one, the advance of the advanced guard—the vanguard—consisting chiefly of cavalry,* should be sent as far in advance as possible for screening, reconnoitring, repairing roads, and for minor operations against small hostile bodies; while the other, intended chiefly for serious engagements with the enemy, moves in rear. The vanguard, in its turn, gives off several small detachments, which precede it along the main

* In special conditions of ground, or in expectation of a stubborn resistance, infantry (sometimes carried in carts) may be added.

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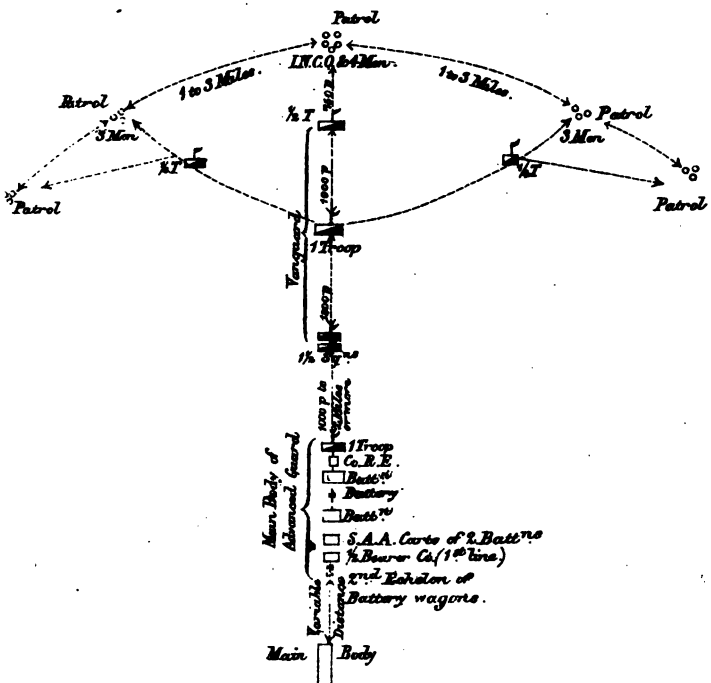
face p. 110.

ORDER OF MARCH OF ADVANCED GUARD OF A DIVISION.

(TOLERABLY OPEN GROUND)



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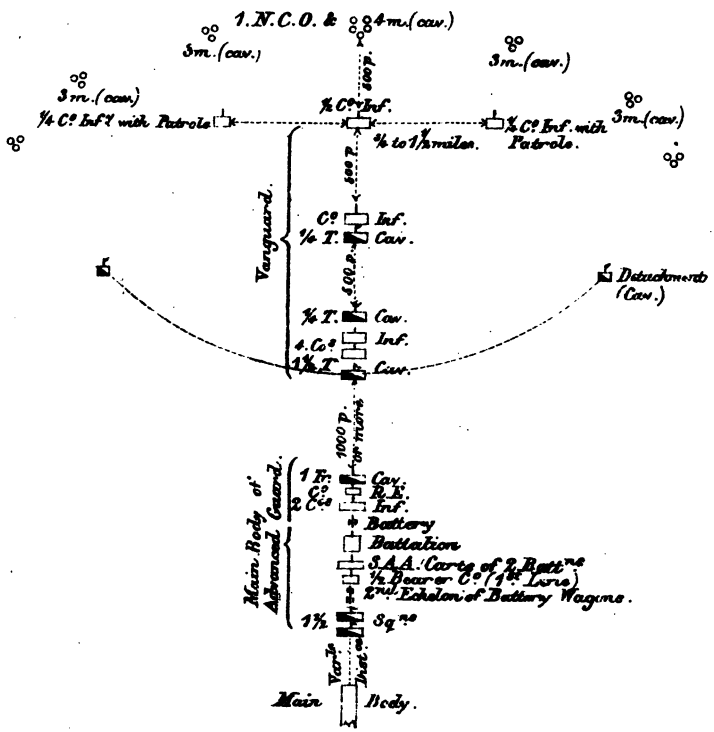
face p. 111.

ORDER OF MARCH OF ADVANCED GUARD OF A DIVISION. (CLOSE AND INTERSECTED GROUND)



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direction of advance, and, if not upon all, at least on the chief lateral roads; these detachments throw out other smaller bodies towards the enemy until the extreme feelers consist of small separate patrols. The strength of the whole vanguard may vary from $\frac{1}{10}$ to $\frac{1}{3}$ of the advanced guard.

Each of these small bodies should have as its chief object to screen the larger body from which it is detached, and give it time to prepare for fighting.

The number of patrols and flankers sent out from the vanguard and their strength depend on the size of the advanced guard, and are determined by the necessity (1) to reconnoitre quickly and far in advance and to the flanks, and (2) to keep up perfect intercommunication with the vanguard and the flankers of the neighbouring columns. Accordingly, these patrols are of two kinds: the one thrown out in front and on the flanks of the vanguard, marching there the whole time at the appointed distance and as far as possible without losing sight of each other; the other class of patrols are those sent out at frequent intervals to keep up communication with the neighbouring columns.

Of course, the distance to which the patrols of the first kind should be sent cannot be laid down even approximately. It will depend on the position of the enemy, the nature of the ground, the time of day, and the state of the weather. With bad roads, thick weather, or at night, as also in a very enclosed country, there should be more patrols; they should be nearer together and not thrown out too far. In open country and clear weather, they may be fewer in number and detached further in advance.

An economical use of cavalry is very desirable. In the majority of cases small patrols suffice to gain information; for small parties of well-mounted horsemen can usually pass where large bodies would be detected. If the enemy is near and in force, and his cavalry are in place, they will not allow our patrols to penetrate. In such case we must use a larger body of cavalry, with horse artillery, if necessary, to gain the required intelligence.

In advancing it is not necessary to search the ground minutely; the cavalry would make but little progress were they to do this. No gathering of troops of sufficient ize to be dangerous to the main body could lie hidden,

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and small parties of the enemy are not likely to run the risk of being cut off.

All information obtained by the patrols and any prisoners captured should be at once sent to the commander of the advanced guard.

(2) Main body of advanced guard.

After detaching all the advanced and flank detachments from the advanced guard, the remainder follow ordinarily in one or more columns, according to the number of troops. The chief conditions to be satisfied are concentration and preparedness for fighting.

Consequently, not only should all that is considered necessary for the main body as regards concentration and readiness be observed, but certain special measures should be adopted:—

(1) The heavy baggage of the advanced guard should follow the main body (not its main body), heading the baggage of the column.

(2) As small a marching area as possible should be occupied; hence only divided into several columns, when roads are close and parallel, in case, for instance, of an army corps forming the advanced guard of an army. Otherwise the advanced guard should be in one column.

(3) The distances between the units of the advanced guard should be as short as possible, and the troops on as broad a front as the road will admit. If the locality allows, in order to diminish the depth of the column, the guns might take the road, the infantry moving alongside it.

Arrangement of Marches.

Seldom possible to arrange marches beforehand.

It has been already shown that the object of an offensive movement consists in coming up with the antagonist and engaging him. Information, however, as to his whereabouts and intentions is seldom forthcoming so long in advance as to admit of the march being calculated beforehand. As a rule, therefore, any methodical division into stages is impossible, but sometimes, when the initiative is in our hands, or when the position of the antagonist is approximately known, it becomes possible to calculate the march for one, two, or even three stages.

These calculations consist in determining the length of each stage, the places of the night-halts, the time of

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departure of each unit, and the places and times for their rest on the road.

In proximity to the enemy, the length of road covered daily usually presents extremes, greater or less than the ordinary average march. On the whole, the progress made is less. The cause of this is to be found in the greater slowness and the fatigue entailed by marching in fighting order, delays occasioned by the antagonist, and by the necessity for equalising the movement of the columns. Moreover, the more arduous duties during the march and after arrival, the meagre accommodation at the night-halts, and lastly, waiting for the trains far into the night—all these fatigue the troops and prevent them from making long marches. Length of march in proximity to enemy is usually short.

Again, as the arms are mixed up in the columns, the hourly rate and the length of the march have to be calculated for the slowest moving arm—the infantry.

The foregoing causes become more marked in proportion to the length of the column. Thus, for example: while a Division marching independently can accomplish without much difficulty 16 to 20 miles, 16 miles is in the majority of cases a forced march for an army corps, and 12 to 15 miles at the most is the usual march of an army of 3 or 4 army corps.

Besides what has been stated, the length of the stage is influenced by the necessity of selecting for the night-halts places which fulfil the requisite conditions of good fighting and bivouac positions. Bivouac and fighting considerations influence length.

Fighting considerations are often of paramount importance in determining the stages for the advanced guard. It may be frequently necessary to increase or diminish the marches of the advanced guard, with a view to ensuring the occupation of an important point, a good fighting position or a defile, without paying great attention to the fact whether the bivouac ground near these points is suitable. On the other hand, for the main body lying under the screen of the advanced guard, the fighting conditions are not so important in the selection of the night-halt as the housing and supply conditions, especially the propinquity of water.

The columns of the main body are sometimes brought up to a general bivouac on the main road of advance, and sometimes are halted on the roads by which they have severally marched. Which plan should be adopted is generally

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governed by the distance of the enemy, the number of troops, and the nature of the country.

The nearer the enemy the more concentrated should be the bivouacs: large masses may however bivouac over a comparatively wider area. It may be added that for the comfort of the troops, especially if the enemy is at some distance, it is not advantageous to crowd them at the night-halt; as the more space they have, the greater the freedom in getting away next morning.

Movement of columns should be equalised.

If the offensive is taken in several columns the march of the columns should be equalised, so that they may always be on an even front, and more readily form for fighting. This equalisation is effected by appointing a varying hour for the departure of each column, and arranging the long halts by special calculation.

Early start desirable when fight expected.

The same rule holds good here as in marches at a distance from the enemy—not too early a start. But, of course, the position of the enemy, the immediate object of the operations, and the necessity to equalise the march of the columns, may modify this general rule. In the event of a stubborn resistance being expected an early start is desirable; (1) to surprise the enemy; and (2) to get over the fighting early and place the wounded under cover before night.

Time of departure fixed by Commander of Force.

The time for commencing the march is fixed by the Commander of the Force. He usually appoints in the case of an Army Corps, or of a less force, the hour at which the head of the advanced guard and of each column of the main body should commence their respective march; and, in the event of the roads crossing, he fixes the hour at which the rear of the respective columns affected by this circumstance must clear this point.

In the case also of several columns having to pass a certain defile on the same day, a special arrangement must be made as to the hour each should reach the defile with its head. In these cases the troops which have to go the farthest should pass the first. In the same way, in the event of troops having to pass by ferry, the capacity of the boats and the time taken in crossing and returning should be calculated beforehand.

Calculations as to hour of departure of the several units important.

In commencing a march the relation between time and space requires consideration in respect of *sparing* the troops. Knowing the time the head of the column has to set out on its march, the order of march, and the length

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occupied by units in column (p. 98), and after taking into consideration also the state of the roads, the respective commanders have to calculate the hour when their unit should leave its bivouac to join the line of march. This calculation is important in the case of a large body of troops, the difference in the hour of starting of the head and tail being considerable. For instance, in the case of a force of two Divisions moving by one road, the last brigade would not move off until at least three hours after the departure of the head of the column.

It may be useful to remember that a battalion will take 5 minutes to move off in column of route, a squadron 2 minutes, and a battery 4 minutes. The same time would be taken in deploying from column.

Hence, in assembling the troops from cantonments, bivouacs, &c., any unnecessary marches to and fro, between the fall-in and the continuous movement, or any waiting about, are to be studiously avoided. The several points of assembly of the units should be fixed as far forward as possible within their bivouac or cantonment area, and there the units should be combined into echelons, in such wise and at such hours that, by a well-timed departure, a continuous column is formed in the intended order of march. These tributaries should form a stream, which without check or hindrance steadily takes its course along the line of advance.

It is not advisable to appoint a *single* place of assembly for a Division or main body of a Division. The filing off into column would occupy hours and needlessly fatigue the troops, for whom nothing is more trying than long and useless waiting under arms. They should be allowed to rest as long as possible, and not move earlier than is required to take their right place in the column of route.

In the French regulations it is so arranged. The column is formed on the march by the gradual insertion of the various units. A *point initial* is indicated for the head as regards place and time, and each commander on this as a basis orders his march accordingly, knowing the depths occupied and the prescribed order of march.

The train and heavy baggage should either assemble at a general rendezvous before the troops move, or await the departure of the troops by the side of the road, and subsequently follow in a separate column.

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There should be a standing order that no baggage is to move upon the line of advance within the area occupied by the troops until the troops are entirely clear. It is generally advisable to tell off a guard to prevent baggage crowding upon the road leading out of the cantonment area before the troops march.

Halts on the march.

Halts are most important, as marches in a constant state of readiness for battle are very fatiguing for troops.

Long halts.

A long halt, varying from half an hour to two hours, and sometimes longer (in the tropics), is usually appointed by the commander of the whole force, after rather more than half the march is completed. The hour of the halt and the hour at which the troops start again should be stated. The position chosen for the purpose should, if possible, be one capable of defence (*i.e.*, behind some obstacle of ground, river line, range of hills, &c.), all the columns of the main body being on the same level, each column closed up, or in some cases all columns concentrated, and the whole covered by the advanced guard, which takes the necessary measures for ensuring the safety of the troops. In the case of a defile the halt should be made after it has been passed, the baggage being left on the reverse side. It is undesirable to halt in a village.

When the halt is a long one the troops may move to the side of the road, the men remove packs, while the horses should be fed and their girths loosened.

Precautions in hostile country during halts.

When a force halts in this way in a hostile country (*e.g.*, Afghanistan) the advanced, rear, and flank guards should remain on the alert, facing outwards from the column; and when the encampment is reached these guards should take up suitable positions until the camp guards are posted, when they may be recalled, or, if necessary, be replaced by pickets.

During long halts in tropical countries during the day the horses may be hobbled or knee-haltered, and turned out to graze. In this case the herds should be protected by guards, and also by a fringe of patrols.

Short halts.

Besides the long halts, short halts may be allowed of 10 minutes or so occasionally, chiefly to enable the men to ease themselves, and to equalise the march of the columns. They are not fixed beforehand, but are ordered as the necessity arises.

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Concealment of Marches.

All marches, generally, in proximity to the enemy should be made, as has been already said, unseen by him.

It is not, as a rule, possible to veil from the enemy's view the entire march from beginning to end; practically, it is quite sufficient if the enemy is prevented from knowing until too late to exercise interference.

Thus the essence of the business is to conceal from the enemy the object and direction of the march, for a longer or shorter period, so as to force him to lose time by his state of uncertainty.

Amongst the means for concealing the march are the following:—

Means of concealing movement from the enemy.

(1) To execute the march under cover of a detachment, which either remains on the spot on the defensive or engages the antagonist, or, lastly, marches in a direction other than that taken by the mass of the troops.

(2) Keeping secret the intentions and spreading false reports.

(3) Forced marches.

(4) Marching by night, leaving detachments behind to keep alight the bivouac fires.

Generally speaking, when the movement of certain troops is carried out under cover of others (advanced guards, outposts, &c.), either left in position or engaging the enemy, or possibly moving in another direction to that taken by the bulk of the troops, the march of large bodies, even whole armies, may be concealed for a considerable time.

Retreat of the 2nd Western Army (Russian) from Bikhoff to Smolensk in 1812, under cover of Platoff's Cossacks.

The movement of the 2nd German Army, under cover of the 1st past Metz in 1870.

The flank march of General Werder from Vesoul to Hericourt in January, 1871.

In order that the enemy may not get scent of the contemplated movement, the commander should not inform his own troops of his intentions until the moment arrives for carrying them into effect.

A forced march is a very effectual method of gaining time over the antagonist.

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There are many examples in history of bodies of troops of all arms accomplishing rapid and long marches when required, for instance:—

(1) The march of Napoleon I. from Landshut to Eckmuhl in 1809; 80,000 men in two columns marched 24 miles in 8 hours (4 a.m. to 12 o'clock).

(2) The march of Napoleon I. from Casteggio to Piacenza in 1796; 3,000 infantry and 1,500 cavalry—forming the advanced guard of the French army—marched 46 miles in 36 hours.

Combination of Marches.

Precautionary measures.

In the combined march of several columns, the following precautions should be observed.

(1) Heads of columns should move at an even pace.

(2) Apart from the measures of security taken by the Cavalry Division, the columns themselves must take independent measures for their own safety, particularly if marching by a road other than that taken by the general advanced guard. For this purpose each column, without awaiting orders from superior authority, should send forward to distances varying from ½ to 2 miles *advanced detachments*, the strength, composition, and duties of which are determined by the following considerations:—

If the column marches immediately after the general advanced guard, it should detach as its special advanced guard a small body of cavalry, to maintain connection with the general advanced guard in front and with the neighbouring columns. Columns not following the general advanced guard should throw out in front stronger detachments. The columns on the flanks will further detach to the nearest roads on the flanks small bodies of cavalry to guard the flank from any sudden appearance of the enemy.

These flankers should march abreast of the advanced detachments. Sometimes a flanking detachment of all arms is required. In this case a Division might send out a battalion, a squadron, and 2 guns, which would march abreast of the main body.

(3) These advanced guards and flanking parties or detachments, and equally so the columns of the main body, should keep up constant connection together, and with the general advanced guard. This is usually done

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by patrols. Sometimes it is advisable, instead of ordering two columns to keep up communication with one another, to direct that one column shall keep up communication with the other. By this means, the responsibility for this important duty is more directly fixed. It is further very often advantageous for each column to have with the neighbouring columns its own officers to report progress.

(4) On meeting the enemy, particularly if unexpected, all the troops should march to help each other without awaiting orders. It is a general rule to march to where the guns are heard.

(5) Each column of the main body on reaching an important point (village, passage of river, defile, &c.), or on being detained by any local obstacle, should send information as to the time of arrival and nature of obstacle to the Commander-in-Chief and to the neighbouring columns, so that the march of the columns may be regulated if necessary.

The commander of the general advanced guard sends similar information to the Commander-in-Chief.

Duties of Commander of Advanced Guard and his Staff.

Success of an advanced guard depends on properly delegated chain of responsibility.

The success of a well-led advanced guard depends in a great measure on a properly regulated chain of responsibility. Where so much ground is covered as by the patrols and foremost detachments of a large advanced guard, it is manifest that no single individual leader and his staff can do more than direct the machinery. Much must be committed to the responsibility of the officers in command of the advanced and flanking parties, and their respective patrols.

While delegating this responsibility to carefully-selected officers, the commander of the advanced guard looks after the due connection of the extreme patrols and the advanced guard; in his hand concentrate the reins by which the team is guided. His staff exercises a general control over the extreme patrols as regards the objects and directions of their march, but the details of the movements of these and of the detachments must be left to the officers in charge.

Commander:

The *commander of the advanced guard* should join it

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His procedure.

half an hour or so before its departure, give his last instructions to the commanders of the different parts, form the column, and march it off. He would then place himself in communication with any columns moving on his right and left, sending a patrol of cavalry with a written communication of the time of departure and direction of march of his advanced guard.

His position.

His position would be either at the head of the main body of the advanced guard, or at the head of the main body of the vanguard, so as to be able to move rapidly forward to the chain of patrols, and there find out the state of affairs personally. The main body of the advanced guard is at his absolute disposal, to be used how and when he pleases.

The movement of the advanced guard should be sure and rapid, or it delays the rest of the column. At a defile he would accelerate the pace in order to occupy the debouchure. On arriving there, or at any other important point, or in the event of meeting with the enemy, he or his superior in command would send a cavalry patrol to the column on the flanks communicating the circumstances; and in the case of the enemy, the direction of his march, his apparent strength, and any other information. The Commander of the advanced guard also receives similar reports from those columns. On receiving an important communication he would verify it personally, or through a trusted Staff Officer, and then make his own report.

Procedure when the enemy is met with.

The chief matters in the event of the enemy being encountered are (1) rapid and accurate reconnaissance; (2) clear and just conception of the state of affairs in his report to his superior; (3) a proper conduct of the action in accordance with the circumstances and the orders he might receive: either to attack, or to occupy a position until the arrival of the main body, or to retire on the latter, delaying the enemy's advance.

The foregoing remarks also apply generally to the *commander of a flank guard* in an offensive movement.

In a retreat the commander of the advanced guard turns his chief attention to the removal of obstacles which might delay the march of the train and main body following in rear.

Duty of Staff Officer with

The special duty of the Staff Officer with the advanced guard is to give detailed instructions to the com-

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manders of any flank detachments or patrols as to the object in view, the roads they are to take, and the points where they should rejoin the main body. He directs the extreme points of the advanced guard, obtains guides, and asks for the services of some well-mounted cavalry officers, and of a small detachment of cavalry to be placed at his disposal. He gives detailed instructions as to the examination of the country and the observation of the enemy. All these reports are sent to him; he collates and compares them, and sends them to the commander of the advanced guard. Positive and negative reports—the presence or absence of the enemy—are equally important. Advanced guard.

He takes care that connection is properly maintained with the main body of the advanced guard, causes obstacles to be removed with the aid of the engineers; and keeps his eyes open to the peculiarities of the country, the positions suited for battle under certain conditions, their important points, &c. He should be constantly on the *qui vive*, examining the country from commanding sites, causing bye-roads to be patrolled, and so forth. Although the map should be always in his hand, he must not trust entirely to it, as the surface of the country changes with the opening of new roads, &c. Reconnaissances and good guides are necessary to amplify and correct it. "A guide with a halter round his neck is better than the best map," is an old saying.

If the advanced parties find themselves in contact with the enemy, he will reconnoitre with his cavalry, and by capturing prisoners and other means endeavour to find out the strength, direction of march, and intentions of the enemy, and then transmit such information to the commander of the advanced guard.

In the march of an Army or Army Corps to encounter the enemy, the Staff, except those delegated to special duties, accompany their General. Duties of other Staff Officers on the march.

In the forward movement of a Division, the Staff usually heads the main body, but is sometimes with the advanced guard; in a retreat, with the rear of the main body or with the rear guard. The Brigadiers and Staff would be at the head or tail of their own brigades, as the case may be. General Officers frequently halt and allow their commands to file past them, while Staff Officers, by riding down the column, are able to keep their chiefs

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informed of any irregularities. These inspections prevent men from overloading the vehicles, or from riding on them, or placing their arms and packs on them.

A few intelligent mounted orderlies should be attached to Staff Officers for such minor duties as indicating the line of march at cross roads, or in towns, &c.

When a large force is marching by parallel roads, the Staff should report to each other, not only at intervals during the march, as already mentioned, but at the end, on the following points:—The roads by which they are marching, and whether slowly or rapidly; any intelligence they may have gathered about the enemy, where they halt for the night, the villages occupied, and the position of the Head Quarters; at what time important points will be crossed (this during the march to regulate equality of march); in what time, in what strength, and by what roads the neighbouring columns could be supported.

It is the duty of the Staff to keep most carefully the various reports received during the day in the order in which they come to hand. A successive number should be given to each, and the hour marked when received, so that the General may be in no doubt as to the time and place when the circumstances mentioned have occurred.

There are some minor details to be remembered, such as to provide escort for the General, to detail parties to pitch and strike Staff tents, to make the necessary postal arrangements, to provide orderlies and means of communication with Head Quarters.

Marches in Retreat.

The immediate object of the retreating force is exactly the opposite of that of the assailant, and is, in effect, to avoid an encounter with the antagonist until a more favourable moment.

Secrecy and rapidity of primary, concentration of secondary importance.

Consequently secrecy and rapidity acquire great importance; on the other hand, concentration is not of such great necessity as for the assailant.

The means for promoting secrecy have been already discussed; for increasing the rapidity, the same means are used as when the enemy is at a distance, except the use of carts and railroads, to which recourse can only be had under very favourable conditions.

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Thus the marching area of the main body may have a greater breadth compared with its depth. A greater number of roads will diminish the depth of each column, and thus eliminate one of the causes of slowness and fatigue. Means to this end.

Hence, in selecting the roads, the main point requiring attention is their quality; not so much the interval between them or the nature of the intervening country. A Division may conveniently move in two columns; a corps in three, four, or more columns.

The conditions, however, of rapidity and uninterruptedness of march cannot be attained by merely increasing the number of roads. The troops have to march *behind their trains* which cannot move faster than $2\frac{3}{4}$ or 3 miles an hour, if so fast. Hence the most important task in retreat is that the rate of march of the troops should be as little dependent as possible on the rate of march of the trains. As means to this end, besides the distribution of the troops into a larger number of shallow columns, particular attention must be paid to sending away the train *early*, so as to keep it well ahead, and omit the long halts. Train must be sent on well ahead. No long halts.

The order of march in retreat is the reverse of that for the advance. Before each column should march, a small advanced guard, chiefly composed of engineers (sometimes carried in carts) to clear the roads, repair bridges, prepare demolitions, and so forth; the strength of such advanced guard and its distance in front will depend naturally on the probable work before it. If the retreat has to be made through a hostile country, the advanced guard may be composed of all arms; if the country is not hostile, the advanced guard may be just sufficient to clear the way, and for police duties. Order of march of main body.

Behind the advanced guard march the heavy trains, their march being calculated so that they do not detain the main body. The best roads should be assigned to them, irrespective of the columns to which they belong. Train should march by best road.

As instances of a retreating force being hampered in its retreat may be mentioned:

Retreat of the allies after the battle of Dresden, 1813, where the retreating columns were much delayed by the encumbered and bad roads through the mountains.

Retreat of the French army from the right to the left bank of the Moselle in 1870.

Behind the trains, at a distance of not less than 5 miles

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and, if possible, 2 or 3 days' march, follow the columns of the main body, so distributed that the nearest to the enemy shall be that arm which, from the nature of the ground, is most likely to be required for the support of the rearguard.

Flanks to be protected.

If the retreat is by several roads, the flank columns should send out on the flanks, abreast of the rearguard, special flankers, consisting mainly of cavalry, so as to give timely notice of any attempt to intercept the retreat.

Rearguard: its task.

Rearguard: its Object, Strength, Composition, and Order of March.—Its object is to enable the troops, whose retreat it is protecting, to move with freedom and with secrecy. It must, therefore, delay the adversary, and prevent him from striking the main body.

Line of operations.

In order that it may execute this mission most effectively the rearguard should march along that road by which it can best cover the whole marching area, or by which the enemy's attack is most probable. On the adjacent roads it should have separate detachments.

The distance of the rearguard from the main body depends entirely on circumstances. No approach to a rule can be given.

The task of the rearguard is very difficult, particularly after a battle, when the enemy is close, strong, and full of energy; when the roads by which the main body is marching are bad, spoiled by the weather, or when the trains are detained. It is rendered still more difficult by the unfavourable position, from a moral point of view, inherent to a retreat.

Strength.

As regards its strength, it must be remembered that the larger the force composing it, the less quickly can it get away. Much will depend on the conditions under which the retreat is undertaken, on the character of the antagonist, and the nature of the ground. If the enemy is weak and lacking in enterprise and initiative, or if the ground favours a stubborn resistance, a less strong rearguard is required than when the antagonist is strong and energetic, and the ground unfavourable for defence. But, as a general rule, rearguards in a retreat are stronger than advanced guards, and may be as much as ½ of the force from which they are detached.

Composition.

Rearguards should be composed of the best and freshest troops, and of all arms. Cavalry and horse artillery are

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especially suited for its composition, those being the arms used by the adversary in pursuit. Artillery is perhaps the most important arm; its wide-ranging projectile is the best means of keeping the enemy at a distance, and that is the chief object of a rearguard. If the ground is tolerably open, the whole of the cavalry and horse artillery may be put into the rearguard; if the country is close and intersected, infantry and field artillery must play the chief rôle. The rearguard must not allow itself to become committed to an obstinate fight, as this often entails great loss, and may necessitate the return of the main body in order to extricate it—the result of all others to be avoided.

Rear detachments.

For its better protection from sudden attacks the rearguard should throw out *rear detachments*, that is to say, its own rearguard and flank detachments, and these again should be protected by smaller parties and patrols. These two last are chiefly of cavalry, the rear and flank detachments of cavalry and horse artillery, and even infantry, to give them a certain independence.

Besides the patrols forming the feelers of the rearguard, others are used for reconnoitring to long distances with the object of obtaining timely notice of any large hostile force hanging on the flanks.

Order of march of rearguard.

After making these detachments for the protection of its rear, the rearguard should march as concentrated as possible, the troops being so arranged in order of march that those first required to meet the enemy should be nearest to the tail, and so on; such portion of the non-combatant train, as, for instance, the small arm ammunition carts and bearer company, as may probably be required, being with the rearguard, and all the rest sent on with the main body, joining the rearguard only at the night-halts.

Duties of rearmost detachments.

The duties of the rearmost detachments are to keep the enemy always in view, discovering his movements and intentions, and destroying supplies, roads, bridges, and such like, in order to throw obstacles in the way of the pursuing force.

The mode of detaining the enemy, of taking the offensive on a favourable opportunity, and, in short, the conduct of a rearguard in retreat is considered under the head of military history, and will not therefore be touched upon here.

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Calculations of the march.

It is, as a rule, impossible to prearrange the marches, so much being dependent upon the operations of the enemy.

Among the duties of the Commander may be mentioned the following:—

Duties of Commander and Staff.

(1) He must exercise unremitting vigilance; (2) look to the preservation of order and discipline; (3) maintain the courage of the troops; and (4) not allow himself to be thrown back on the main body. He must pay particular attention to the flanks and the roads by which the enemy might get round him, and send along them, if necessary, strong and independent flank detachments. If pressed, he would retire by alternate units from position to position; leisurely or not, according to the character of the pursuit. He would break up the roads and bridges, but not the railway bridges, without special instructions. Ambushes should be frequently employed, as the fear of them makes the pursuer move more circumspectly and slowly.

Duties of Staff Officers with rear-guards.

The position of the Staff Officer is chiefly with the rearmost troops. He should keep the enemy always in view, and warn in good time the commander of the rearmost detachments of dangerous points, such as defiles; to this end he must search the ground right and left, plan obstacles (abattis, blown-up bridges) in the way of the enemy's advance, and point out favourable points for ambushes.

As a rule there should be a second Staff Officer with the rearguard proper, whose duty it is to lead the main body of the rearguard by the right road, to point out the positions in which the rearguard might accept battle under most favourable conditions, for instance, behind a defile. When the troops reach such a selected position, the Staff Officer will seek the necessary instructions from the commander as to their disposal. If it is decided to burn a village, care should be taken that it is not set on fire until all our own troops have passed through.

Example. Blucher's surprise of the French advanced guard at Hainau in 1813.

Flank Marches.

Definition.

By a flank march is understood such a march rela-

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tively to the enemy, that during its execution the bulk of the hostile forces are on the flank of the troops.

Attended with danger.

Flank marches are dangerous, as in the event of failure the line of retreat may be intercepted—for which reason Napoleon advises that they should be avoided, but if undertaken, that they should be short and rapid.

Object of a flank march.

The object of a flank march may be either:

(1) A change in the line of operations, for example:—

The change in position of the French army from Voghera to Novara, in 1859, before the battle of Magenta.

The movement of Werder's Corps from Vesoul to Hericourt in January, 1881, when retiring to cover the siege of Belfort and to take up a position behind the Lisaine to await Manteuffel; or

(2) The junction of two separate parts of an army, for instance:—

The march of Davoust's Corps from Ratisbon to the Abens in 1809.

The contemplated movement of MacMahon from Rheims to Metz in 1870; or

(3) To turn the enemy's flank, as—

The march of the French Army before the battle of Arcola in 1796.

The movement of Radetzky from Verona to Mantua in 1848.

The movement of the 2nd German Army in the neighbourhood of Metz in the middle of August, 1870.

No matter what the object of a flank march may be, the troops executing it must avoid an action until it is completed. This is the very object the antagonist will endeavour to defeat; his aim will be to bring on a general action.

Disadvantages of a flank march.

This is not the place to point out the strategical disadvantages of being discovered making a flank march. The disadvantages for the march itself are these:—

(1) For the flank march of even the smallest detachments, at least three parallel and convenient roads are necessary; one for the covering body, or flank guard, as it is called, another for the main body, and a third for the train. Moreover, there should be numerous cross roads, so that if the flank guard is severely handled, the other columns may be able to move by the cross roads to support it. These conditions are sometimes very difficult to fulfil.

(2) The distribution of the troops and train can be

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seldom made according to the quality of the roads, as it is necessary to send the covering body by the road nearest the enemy, and the trains by that most remote, which may possibly involve a long detour and be least suited for transport.

(3) The difficulty of keeping the three bodies of troops on an even front is great. Each must conform to the pace of the slowest.

Means of obviating the unfavourable conditions.

In order to obviate the unfavourable conditions of flank marches, we should (1) execute them as far as possible from the enemy, and (2) under cover of an impassable obstacle, or one passable only at certain places.

The greater the distance from the adversary, the less the probability of his hindering the march, and consequently the greater the security for the troops. On the other hand, as the distance increases, so the duration of the march increases, and the rapidity diminishes in proportion. Hence in selecting the area for a flank march, we must first decide which is the most important—safety and sparing the troops, or rapidity; and then fix the marching area accordingly.

Local obstacles (especially rivers) can only guarantee a flank march when the side undertaking it commands this obstacle; that is to say, possesses or can hold its debouches.

The Adige during the march before the battle of Arcola in 1796.
The Danube during the movement of Napoleon to Vienna in 1809.
The Po and Sesia during the flank march of the French army from Voghera to Novara in 1859.

A navigable river or railway running in the same direction as the flank march would materially expedite it.

As regards the dimensions of the marching area, it is evident that the greater the number of roads the better; the columns, being less deep, will move more quickly.

The march of MacMahon's Army of four Corps from Rheims to the Meuse in 1870 was cumbrous and unwieldy, only two roads having been assigned for the purpose. In the result the movement was so slow that the object contemplated was not attained.

March of main body.

It is important that the main body should be as much concentrated as possible; there should be connection between the parts, and they should all be ready to deploy

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for fighting. Further, it is of great advantage if the roads be near together, no local obstacles intervening, and if there be abundance of transverse roads. In particular, the roads by which the flank guard marches should not be separated by any serious obstacle from the road or roads by which the main body is moving.

In practice it is not always possible to have these favourable conditions, and things must be taken as they exist; perhaps—open country, not more than three roads, and the enemy in close proximity.

In such cases, for ensuring the success of a march, besides rapidity, and particularly secrecy, it is necessary to distribute the troops and trains well, to calculate the march, and arrange for protection and patrolling.

In distributing troops and trains for flank marches it is necessary to observe the following rules:—(1) along the roads nearest the enemy to send the covering troops, *i.e.*, the flank guard. This flank guard might be merely an observing force of cavalry, or might consist of all arms. Cavalry suffices if the distance is considerable between the two armies, or if the ground favours the march; otherwise, the flank guard should consist of all arms, and take up a good defensive position, under cover of which the main body and trains could complete their movement. It should avoid, if possible, attracting the enemy's attention. (2) Along the roads least exposed to danger, but at the same time convenient, to send the train. (3) Along the remaining roads, to move the main body, in one or more columns, according to the available roads; remembering that along the road nearest to the flank guard should be sent the largest proportion of that arm which is most required for its support. Moreover, it is desirable that the supporting troops should belong to the same unit as the flank guard.

Each column of the main body should have its own separate small advanced and rear guards, generally of cavalry. Those of the column nearest to the flank guard should consist of all arms, and be of greater strength. The advanced and rear guards of the columns should not be far off (1 to 3 miles), and should detach patrols to the front and flanks. Sometimes for the seizure of a point of strategical or tactical importance in the direction of the march, a strong advanced guard should be sent forward.

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The trains, with their escort, should march in the usual order for transport in the neighbourhood of the enemy.

Flank guard.

Flank Guard : Strength, Composition, and Order of March.—If the marching area is not covered on the side of the enemy by a natural obstacle, the strength and composition of the flank guard and its distance from the main body depend on the propinquity of the enemy and his character, the breadth of the marching area, the quality of the roads, and the nature of the ground.

Composition.

Cavalry and horse artillery are important constituents of a flank guard, as they mask movements well.

If the marching area is protected by a natural obstacle allowing access of the enemy at certain points, then each of these points should be occupied in succession by strong detachments from the main body.

Measures of security.

The flank guard, for the better securing of the flank march, will send out its flanking, advanced, and rear detachments, which have also their detached parties and patrols, the extreme feelers being usually of cavalry.

Task of flank guard.

The task of the flank guard is more difficult than that of an advanced guard, as the primary object of the main body is to complete its march, not to support the flank guard. The latter endeavours throughout the movement to be between the enemy and the main body. In doing so it will be at a disadvantage, as its own flank is exposed, and the watching of the enemy becomes more difficult.

Strength.

Its position is even more difficult than that of a rearguard when the enemy is close and enterprising, and it should therefore have the same strength in these circumstances.

Calculation of the march.

The march of all the parts should be so calculated that at a given minute the flank guard should be opposite the centre of the main body, and the latter opposite the centre of the train. This equalisation of the march is attained by appointing a corresponding hour for starting and for the long and short halts. The long halts should be made at the intersection of the roads leading towards the enemy.

If a flank march of considerable extent has to be made it is often necessary to make forced marches, especially the first. The greater the distance that is placed between the troops and the enemy at the outset, the more probable the success of the operation.

The chief duties of the flank guard, therefore, are:—

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(1) To obtain information of the enemy and guard the main body from an unexpected encounter with him.

Recapitulation of the chief duties of flank guard.

(2) To take all measures for delaying the march of the enemy, as, for instance, to make demonstrations and partial attacks, destroy bridges and roads leading to the marching area, and—

(3) In the event of the enemy attacking in force to engage him until the main body and train have passed onward in safety.

Night Marches.

By the light of a full or nearly full moon, and along good roads, troops will march almost as fast as by day; and, even in unfavourable circumstances, history furnishes many instances of good troops accomplishing night marches without detriment.

When there is no moon, the case is different. Although even in these circumstances a night march may be of great service (to abandon a battle-field unseen, to elude the adversary's pursuit, or to move in a selected direction to prepare a surprise), it has many disadvantages and may lead to a catastrophe. The worst feature of all is that the troops are deprived of their rest; they fall asleep and are difficult to rouse; men and horses flounder along and little ground is got over; disorders are easily multiplied; columns are prone to miss the road, and panics are apt to occur from insignificant causes.

Great caution must be exercised, and the following points must receive attention.

(1) The roads should be reconnoitred beforehand, as also the bridges, ascents, and descents, where the movement might come to a standstill.

(2) The troops should be differently distributed than for a march by day. At the head of the column should move engineers and infantry and a small force of artillery, preceded by cavalry patrols *along the line of march;* the rest of the artillery and cavalry should march in rear, as these arms cannot act in large bodies in the dark. If the march is a retrograde one, the bulk of the artillery and cavalry would be in front.

The covering body (advanced guard, rearguard, &c.),

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should not be far in advance, and the part nearest to the enemy must keep a sharp look-out.

(3) Strict order, discipline, and silence must be maintained from first to last—a difficulty in the darkness. No bugling, smoking, or fires allowed. All words of command to be given in a low tone.

(4) Orderlies to be posted at all cross-roads and turns of the road to indicate the way, and not to leave their posts until the whole column has passed.

(5) Constant connection to be maintained between the separate units. The unit in front must be held responsible for the direction of march of the one following it.

(6) If a halt has to be made in a night march through an unknown country, it is better to fix an hour than a place. It is desirable to omit long halts, as the men fall asleep, are difficult to arouse, and may stray away and be forgotten.

(7) A number of guides should be taken who know the country well. They should not be dismissed until they have brought the columns safely to their destination.

(8) Men should not carry their arms loaded. A shot fired at night may cause a panic among the men or a stampede among the horses.

(9) When halted, the men should not move from the road, but remain standing arms in hand, and not be allowed to sit or lie. Mounted men dismount and stand to their horses.

Orders for the March.

For general remarks as to the framing of orders, see Chap. II., p. 35–46.

After the commander has considered the locality through which the march has to be made, collected and verified all available information, and upon this as a basis has calculated the movement, and made a suitable distribution of the troops, his staff then work out the detailed orders.

The issue of orders for the march is the duty of the Adjutant-General's Department, the actual arrangements being worked out by the Quartermaster-General.

Object of the Commander-

The form in which the views and intentions of a com-

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mander should be communicated to the troops is more important in war than in peace. At one time, when the forces placed in the field were small, the scope of the operations limited, and the intellectual state of the rank and file at a low standard, orders were exceedingly brief, and in many cases were kept secret from all except the Commander-in-Chief, his Staff, and a few trusted Generals. It was not considered advisable that the soldier should "think." This practice has been changed, even among the most backward nations, from its being no longer applicable to the circumstances of the present times. It is now generally acknowledged that the intellectual condition of the army is so improved that the soldier can carry out his duties better and co-operate to the common end more thoroughly by understanding to a certain extent the object of the Commander-in-Chief. It is not, of course, implied that intended operations should be communicated to the army long beforehand. On the contrary, for their success it is often absolutely necessary to keep them secret. But what is meant is, that immediately before a tactical operation, when the time for secrecy has passed, the subordinate commanding officers, and to a certain extent the soldier, should have some knowledge of the aim which the Commander-in-Chief has before him. All officers, down to Battalion, Squadron, and Battery Commanders should certainly know the intended scope of the operations. Hence it is usual for the first paragraph of the orders for a march in presence of the enemy to contain a short statement of the circumstances of the latter, while the second paragraph enters into the general scope of the operations intended for his discomfiture. But care must be taken to give no intelligence of a doubtful or conjectural nature, as mistrust in the leaders is thereby apt to be engendered. It will be generally desirable to state whence the information with regard to the enemy is derived. Thus, if the first paragraph of the orders runs "Intelligence derived from peasants, spies, &c.," or "Reports from patrols state, &c., &c.," then every commander, seeing the source, is able to estimate its probable worth and the amount of credibility to be attached to the information. The greatest precision should be used in wording the opening paragraph respecting the enemy's position, as every word is weighed by its readers.

in-Chief should be known to his subordinates.

Orders should be prefaced with information about the enemy.

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Precision essential.

Orders should be succinct, clear, and precise, especially as regards time and place; the more this is attended to, the less are those orders liable to misinterpretation. They should always be drawn up on the same general principle as regards arrangement of paragraphs, and this form should be used at all times whether in war or at manœuvres. The recipient of the order is often awoke from sleep to read it by the light, perhaps, of a dim lantern, and, if accustomed to the form, his eye falls more readily upon those paragraphs which closely concern him.

Identity of form desirable.

Not infringe responsibility of subordinates.

All details should be omitted which are supposed to be known to the commanders, or the carrying out of which might, and should, vary with a change of circumstances; in brief, which might fetter the desirable independence of subordinate leaders.

Orders emanating from the different grades of the military hierarchy vary in their scope. The higher the commander, the more general, without being less definite, are the orders proceeding from him. The admission of details increases as we proceed downwards in the scale of commanders. This is necessary to bear in mind, as the tendency is to go into too much detail, thereby infringing on the responsibilities of subordinate commanders.

Orders received from a higher commander should not, as a rule, be repeated word for word in the orders of the inferior commander, nor enlarged upon; but extracts or an abstract should be made of what is necessary for the information of the commanders next lower in the scale.

Let us now take the different commanders in order, and state some general principles with respect to their orders.

Army orders.

Commander of an Army.—His orders, when at a few marches distance from the enemy, may indicate beforehand for the next few days the daily destination of the units—the Army Corps. But when the enemy is close, these movements must be regulated day by day.

In this latter case, when no engagement is expected for the day, the destination, the points to be reached by the covering body (advanced guard, &c.), and the directions for reconnoitring, should be broadly indicated.

If a collision is expected, the order must contain instructions whether the march is to be carried out at all hazards, or left optional to the commanders, or whether

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fighting is to be avoided. Sometimes, when the situation is not clear and further intelligence is awaited, it is desirable to order the movement to be carried out as far as a certain line, and there await further orders, and an hour may be prescribed at which, in the absence of further orders, the march is to be continued.

For instance.—The Army will march with its three Army Corps to Twyford, Bracknell, and Sunningdale. It will, however, halt on the line of the Thames until 11 A.M., when, in the absence of fresh orders, it will continue the march.

As regards reconnaissance and patrol work, the desired directions should be indicated, while for connecting the columns and linking them with the Cavalry Divisions or Brigades in front, special troops must be held responsible.

In respect to the choice of roads by commanders, the greatest amount of freedom must be allowed. When a large Army is marching on a broad front, the different Corps are assigned definite zones for marching, cantonments, and requisition purposes. These limits may be best defined by naming the roads, taking care to show to which unit the several roads and the villages on them are assigned.

When definite zones are assigned in this way to the Army Corps, the commanders of the latter are allowed free disposal of their baggage and train. But if the army is closely concentrated on a narrow front, or a change of front has to be made, or there is a prospect of a flank or retrograde march, general orders would be issued for the baggage and train lest they clash or stand in the way of the troops.

Hence, Army Orders would take somewhat the following form (numbered paragraphs) in the case of a march within striking distance, but no collision imminent:—

(1) Intelligence about the enemy,* sufficient to inform the next subordinate commanders of the general position of affairs.†

* In the information about the enemy nothing that cannot be substantiated or is doubtful.

† If the circumstances are changing so rapidly that it is impossible to anticipate intentions by even a few hours, the orders should merely indicate the places for the assembly of the troops in the morning, ready for the march. The uncertainty of the situation will be thereby apparent to the Subordinate Commanders.

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(2) General object of the march and intention of the commander.

(3) Distribution of the troops by roads, or the lateral limits* in the case of large bodies, with the towns, &c.,† through or near which they have to pass. Appointment of commanders of columns, if necessary.

(4) Measures of security.—First, as to the cavalry in advance; composition and distances of advanced guards;‡ strength, object, and direction in which any special flanking detachments are to be sent, and from which column to be detailed; arrangements for occupying any important point, destroying a bridge, and so forth.

N.B.—All detail of arrangements as to detaching troops from advanced or rearguard is to be left to the commanders of these latter.

(5) Time of departure of columns, and, in some cases, the time of the advanced guard, main body, and train in each column.

(6) Places and duration of the long-halts for each column.

N.B.—If the enemy is expected to be met with, the long halts should not be mentioned in the order, for as the possibility of making a long halt depends on the enemy's proceedings, it is unadvisable to communicate to the troops arrangements which events may entirely alter.

(7) Sequence of trains. When a collision is imminent, these should be left behind in a convenient spot, which should be known to the troops.

(8) Arrangements for the relief or reinforcement of the outposts.—These are best relieved before the commencement of a new march. If relieved after the march is over, the knowledge which the advanced troops have gained (during the march) of the enemy's position would be thrown away.

(9) Special arrangements for passage of obstacles, where necessary, or for supplies.

(10) Any change in the Head Quarters, giving the hour at which the commander will quit his present

* See *ante* p. 135.

† The names of towns, villages, &c, should have the native pronunciation added in parenthesis. Sometimes it is desirable that the map used in the preparation of the orders should be mentioned.

‡ Rear Guard or Flank Guard in a retreat or flank march.

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quarters and the place where he is to be found during the march.

These orders would deal with the following units—Army Corps, Cavalry Divisions, independent Infantry Divisions, and general advanced guard of the army.

Commander of Army Corps.—When the Divisions are marching by separate roads, the corps orders would be of the same character as the foregoing army orders. When moving by a single road, the orders should be of the same character as the Divisional Orders to be presently mentioned. Army corps orders. (Tables pp. 144-6).

When the enemy is near and the different units have to execute a combined movement, the time and place of departure for each must be fixed; only, however, for the head of each column, so as to leave each commander perfect freedom in forming an order of march suitable to the circumstances.

For instance.—The 1st Infantry Division, 1st Army Corps, will move off its leading troops from the Chequers Bridge over the Basingstoke Canal at 7 A.M., and march by way of Minley towards the bridge over the Blackwater at Sandhurst.

The 2nd Infantry Division will move off with its head at 7.15 A.M., from the north end of Dogmersfield Park, &c.; and so on for the remaining Division.

By so timing the departures according to the length of the road to be respectively traversed by the units, these latter will be more likely to make the combined movement in the manner contemplated.

In some cases it is necessary to fix the hour at which a certain point has to be reached or passed; as, for instance, when columns have to cross on the march, or when a defile has to be passed by more than one column. The commander fixes the hour at which each column would stand with its head ready to enter the defile. The arrangement of the time of departure then devolves on the subordinate commanders concerned.

Example 1.—The 1st Division will have crossed the Staines Bridge over the River Thames by 10 A.M. At that hour the leading troops of the 2nd Division will be ready to commence the passage of the river by the same bridge.

Example 2.—The 1st Division will so regulate its march that the main road between Bagshot and Blackwater shall be left free for the use of the 2nd Division between 9 and 11 A.M.

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The units in the case of an Army Corps, disposed of in the orders, would include Divisions, Corps Artillery, Corps Engineers, advanced guards, &c. Their Commanders would, in turn, issue orders based on the corps orders.

Division orders (Vol. I. pp. 144–5).

Commander of Division.—His orders indicate destinations only when marching in several small columns; when moving by a single road, the order for the march would simply set the troops in movement, and leave the rest to be ordered on the spot. In some cases it may be desirable only to place the troops in readiness, leaving the march to be ordered on the spot by word of mouth.

When the advanced guard is to consist of all arms, its composition* and its object must be indicated. Time of departure, direction of march, and instructions for reconnoitring must always be included, but the Order of March and the details of the carrying out must be left to the commander concerned. On the other hand, as regards the main body, the order must contain all arrangements for bringing the units without delay into the desired order of march. No further orders are necessary, as the Divisional Commander's position is at the head of the main body, and thence he can give the necessary orders on the spot.

As regards the arrangements for bringing the various units into the column of route, the old practice of assembling a large body of troops on one general parade, and thereby keeping them many hours unnecessarily under arms, was a great mistake; and it is found much more convenient to combine the units into small groups, according to their positions in night quarters, and then let them flow from the side roads into the main road, following one another in the sequence imposed in the order of march.

To illustrate this by an example:—Let us suppose a British Division (war footing) to be moving from Staines upon Basingstoke, and to halt for the night about Bagshot. The enemy is in the immediate vicinity of Basingstoke.

The advanced guard—consisting of the 1st West Kent and 2nd Bedford Regiments, 3 Squadrons 3rd Hussars, K–2 Royal Artillery, and a ½ Bearer Company—is to

* The composition of the advanced guard and of the advanced and flank detachments should be frequently changed, as also the order of march of the column, so as to exercise the troops in turn and equalise the arduous duties.

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bivouac to the west of the "Jolly Farmer" Inn (the main body near the inn) watching the roads leading through Blackwater and Frimley.

The main body is quartered as follows:—In Bagshot—2nd Lancashire Fusiliers and 3rd Rifle Brigade (Divisional Battalion), 1 Squadron 3rd Hussars, M-2 and O-2 Royal Artillery. In Windlesham—2nd Infantry Brigade, 14th Company Royal Engineers, ½ Bearer Company, and the Divisional Train (Divisional Ammunition Reserve, Field Hospitals, and Commissariat).

Divisional Head Quarters in Bagshot Park.

The latest information about the enemy, derived from a trustworthy source, is that at 9 P.M. on the 13th September he is still at Basingstoke.

The task is to write the orders for the resumption of the march on the 14th September.

The circumstances in which the Division is placed are of common occurrence in time of war. A Division advancing by a single road to encounter the enemy halts for the night. The advanced guard, being open to the enemy's enterprises, bivouacs in a concentrated form, with patrols thrown out towards the enemy's expected direction of advance. The main body, under cover of the advanced guard, is quartered in a convenient village or villages, its units being disposed according to their relative position on the line of march on this day and for the next day. Due consideration is paid in the distribution to the proper protection of the mounted units while in night quarters.

Divisional Orders by Lieutenant-General A———, commanding 1st Infantry Division.

Head Quarters, Bagshot Park,
13th September, 1883, 9.30 P.M.*

1. The enemy, according to latest reports from patrols, is still at Basingstoke. It is the General's intention to seek him out and attack him. The Division will accordingly resume its march early to-morrow.†

2. The advanced guard, under Major-General B———, commanding 1st Infantry Brigade, will send forward the cavalry at daybreak along the main road over the Hartford Bridge Flats, and also by the roads:

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* It is probable that orders have been already issued in the afternoon, but the latest intelligence (up to 9 P.M.) will have necessitated other orders.

† Owing to the necessity of anticipating the enemy at the Hart, an unusually early start is made: all troops on the march by sunrise (5.30).

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(1) Frimley—Elvetham, (2) Yately—Bramshill, pushing patrols, if possible, to Odiham (Farnham-road) on the one side, and to Heckfield (Reading-road) on the other, in case the enemy should move upon Farnham or Reading.

Should the enemy be found marching on the main road to Staines, the Officer Commanding the advanced guard will endeavour to secure a good position on the right bank of the Hart stream. A troop of the 3rd Hussars and the 14th Company Royal Engineers from the main body are, in addition to his present force, placed at his disposal for to-morrow.

3. The rest of the advanced guard will march off in such time as to be clear of the "Jolly Farmer" by 5.45 A.M. Its baggage will join that of the main body, under orders from the Divisional Baggage-Master.

4. The main body of the Division will march in the following order:—Troop 3rd Hussars, 2nd Lancashire Fusiliers, 2 Batteries Divisional Artillery, 3rd Rifle Brigade, 2nd Infantry Brigade, ½ Bearer Company.

The troops in Bagshot, with the exception of those assigned by this order to the advanced guard, will, in accordance with instructions to be issued by the Officer Commanding 2nd Lancashire Fusiliers, be ready to march off with their head from the 27th milestone at 5.45 A.M., and follow the advanced guard, preserving a distance therefrom of about 1,000 yards.*

The 2nd Infantry Brigade in Windlesham will be ready to march off from the cross roads† west of the Halfmoon P.H. at 5.25 A.M., and join on to the rest of the column in Bagshot.

5. The Divisional Hospitals, Divisional Reserve Ammunition Column, under escort of half a company of infantry, to be detailed by the General Officer Commanding 2nd Infantry Brigade, will follow the main body at the distance of a mile under the orders of Major B——, commanding Divisional Reserve Ammunition Column.

6. The rest of the baggage and train, escorted by the Divisional Military Police, and under the orders of the Divisional Baggage-Master, will be parked in some convenient spot near Blackwater,‡ on the right

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* It so happens that the distance of the 27th milestone from the "Jolly Farmer" is 1,000 yards. This paragraph of the orders throws upon the Officer Commanding the 2nd Lancashire Fusiliers the duty of fixing the hours of departure from their quarters of the several units. The temporary command of the Officer Commanding 2nd Lancashire Fusiliers would, however, cease on the column being formed in order of march.

† The cross roads by the Halfmoon P.H. are just about a mile from Bagshot Green, to which point the tail of the Bagshot troops will extend. Twenty minutes is allowed by the order to reach this point. In accordance with this, the General Officer Commanding 2nd Brigade arranges the detailed hours of departure from their quarters of his battalions.

‡ It is unadvisable, in view of the general action likely to occur, to bring the baggage and train across the stream, until the result of the action is known.

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bank of the river by 9 A.M., and there await further orders.* Notice of the position selected will be reported to the General Officer Commanding the Division.

7. The General Officer Commanding the Division will receive reports to-morrow up to 6 A.M., at the "Jolly Farmer," after which hour he will be found at the head of the main body.

8. The troops will carry 2 days' cooked rations. Before their departure coffee will be issued, and they will halt ½ hour for breakfast at 8 A.M.

By Order,

C. D.
A. A. G.
1st Infantry Division, 2nd Army Corps.

Upon the Divisional Order as a basis, the Officer Commanding the advanced guard, the Officer Commanding 2nd Lancashire Fusiliers, the General Officer Commanding 2nd Infantry Brigade, the Officer Commanding Divisional Artillery (for the 2 batteries remaining to him), &c., &c., would issue the orders for the respective units under them.

It is sometimes a convenient arrangement to write the Divisional Orders on half margin paper, thus—

Distribution of Troops for _____, 1883.	Divisional Orders for _____.
Advanced Guard (M. G. A.), &c.	The Enemy's Cavalry ....
Main Body	&c. ..... &c. .....

It will be observed in these orders that after the General's intention is proclaimed, the arrangements for carrying out that intention immediately follow. The first troops to move are the cavalry, then the advanced guard proper, the main body, and so on. Therefore, the same succession should be observed in the orders. By following this plan, there will be a succession of arrangements agreeing generally with the order of execution; and this will not only be advantageous as regards clearness and perspicuity, but the recipient in following the orders map in hand will have grasped the whole situation in the quickest manner.

* The Division by this time will have reached Hartford Bridge Flats.

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The orders referring to the baggage and train are, except in the case of orders for a retreat, reserved to the later paragraphs. They should be brief. The troops naturally require to know where their reserve ammunition, hospitals, and food are to be found, that is to say the place; the actual distribution in detail would be better given, if necessary, in a supplementary memorandum to the Baggage Master.

The place where the Commander is to be found should never be omitted; so that reports may find him without fail.

The last paragraph (8) of the orders, referring to a matter of routine, would only be introduced in exceptional cases.

With respect to the assembly of the baggage, it should, as already mentioned, either be collected in rear before the movements commence, or in front as soon as all the troops get clear. The former plan is the least likely to cause disorder, although, if the cantonments are extensive, it entails the troops sending off their baggage a long time before they start, and curtails their rest. The other plan may cause the baggage of the leading troops to come in the way of the hindermost troops.

If the latter plan is adopted, the point for collection of the baggage should be where the wagons belonging to the most advanced troops stand, and at a time when the rearmost troops have passed the point. The order might run—

The heavy baggage will be assembled at 8 o'clock at the "Jolly Farmer," Penny Hill, and will follow the main body at a distance of 2 miles. All wagons will remain at the side of the road until the rear of the main body has cleared them.

Towards the end of the march (at the last halt) orders should be issued showing the cantonments and line of outposts to be taken up.

It should contain the following:—

(1) For an advanced guard (or rearguard), or for the outpost detachments—its camp, bivouac or cantonments, as the case may be, the line of outposts, points or directions to be reconnoitred, special patrolling arrangements, procedure in event of attack, distribution of villages for requisitions.

(2) For the main body—the sites for camps, bivouacs,

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or cantonments, or the distribution in cantonments, the alarm rendezvous, the appropriation of villages for requisitions. All the troops must be informed of the position of the Divisional Head Quarters, and of the hour at which orders for the next day will be issued.

The Divisional Baggage Master will receive orders through an officer of the Staff, who is acquainted with the above orders, and the baggage despatched to the troops in their new quarters.

When no encounter with the enemy is expected, the Staff Officer who has to draw up the orders for the morrow need not be tied to the troops. He should go on ahead and establish his office in the new quarters.

It is not desirable to include in the orders any provision for the eventuality of a retreat. Napoleon was opposed to the practice, but it has been done by some commanders.* The balance of opinion inclines to the view that the troops ought not to be told that their leader is already occupying himself with thoughts of retreat, when every effort should be made to gain the victory.

This does not, however, prevent the General and his Staff from fixing in their own minds the general disposition he would make for the rearguard in the event of a reverse, the position it should occupy, and so forth.

Although all orders are reduced to writing, so that no mistakes may be made and no dispositions forgotten, the commanders of the large units would, whenever the troops are concentrated, as in bivouac or close cantonments, assemble the commanders under him, and by word of mouth communicate the orders for the march, and add any further explanations which may be necessary.†

* Archduke Albrecht before Custozza in 1866.

† Staff Officers attending to receive orders for "marches" should always know the number of days for which there are reserves of food available for their respective units, counting from the next morning.

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Brigade of Cavalry and Infantry (without Tents).

Composition.	Officers and Men.		Horses.			Guns.	Carriages.			
	Officers.	Total, all ranks.	Officers'.	Troop and Draught.	Total, all kinds.		Carts or Light Wagons.	Wagons.	Forges and Spare Gun Carriages.	Total, all kinds.
Brigade of Cavalry.										
Staff	3	11	11	...	11	...	...	...	...	...
3 Regiments	96	1,986	288	1,572	1,860	...	3	24	3	30
1 Battery, Horse Artillery	7	182	15	168	183	6	...	9	1	10
Chaplain's Department	1	2	1	...	1	...	...	...	...	...
Commissariat and Transport ...	3	67	3	82	85	...	2	16	1	19
Medical Department*	5	104	5	45	50	...	2	17	...	19
Postal Department	...	2	...	...	...	...	...	...	...	...
Total...	115	2,354	323	1,867	2,190	6	7	66	5	78
Brigade of Infantry.										
Staff	3	11	11	...	11	...	...	...	...	...
3 Battalions	90	3,288	39	135	174	...	12	24	...	36
Veterinary Department	1	3	2	...	2	...	...	...	...	...
Chaplain's Department	1	2	1	...	1	...	...	...	...	...
Commissariat and Transport ...	2	49	2	46	48	...	2	8	1	11
Total...	97	3,353	55	181	236	...	14	32	1	47

* Includes half a Bearer Company. Receives transport horses and drivers from the Commissariat and Transport Department.

NOTE.—An Infantry Brigade depends on the Divisional organisation for its Medical and Postal Services.

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A Division (without Tents).

Composition.	Officers and Men.		Horses.			Guns.	Carriages.			
	Officers.	Total, all ranks.	Officers'.	Troop and Draught.	Total all kinds.		Carts or Light Wagons.	Wagons.	Forges and Spare Gun Carriages.	Total, all kinds.
General Staff of Division	16	57	41	...	41	...	...	...	...	...
2 Brigades of Infantry	192	6,703	107	363	470	...	28	64	2	94
1 Battalion of Infantry	30	1,096	13	45	58	...	4	8	...	12
1 Regiment of Cavalry	32	662	96	524	620	...	1	8	1	10
Field Batteries, { 1— 9-pr.	7	174	8	124	132	6	...	9	1	10
Field Batteries, { 2—16-prs. ...	13	401	14	300	314	12	...	18	2	20
1 Divisional Ammunition Reserve	6	217	7	250	257	...	22	26	3	51
1 Company of Engineers	6	204	11	35	46	...	...	6	...	6
1 Troop of Military Police	2	75	4	66	70	...	...	...	...	...
Chaplain's Department	1	2	1	...	1	...	...	...	...	...
Supply and { 1st Line	4	87	9	100	109	...	1	19	1	21
Transport { 2nd Line	4	121	6	142	148	...	...	31	1	32
Medical Department—										
Bearer Company...	14	223	20	89	109	...	5	35	...	40
2 Field Hospitals*	17	180	25	93	118	...	6	20	...	26
Postal Department	...	3	...	...	...	...	...	...	...	...
Total	344	10,205	362	2,131	2,493	18	67	244	11	322

* The transport for the Bearer Company and two Field Hospitals is furnished by the Commissariat and Transport Department.

NOTE.—There are slight differences in the distribution of the Commissariat and Transport Corps between the 3 Divisions of an Army Corps.

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An Army Corps (without Tents).

Composition.	Officers and Men.		Horses.			Guns.	Carriages.			
	Officers.	Total, all ranks.	Officers'.	Troop and Draught.	Total, all kinds.		Carts or Light Wagons.	Wagons.	Forges and Spare Gun Carriages.	Total, all kinds.
General Staff of Corps	25	101	82	...	82	...	...	...	...	...
3 Divisions	1,031	30,613*	1,085	6,391	7,476	54	306	627	33	966
1 Brigade of Cavalry	115	2,354	323	1,867	2,190	6	24	49	5	78
Corps Artillery — Regimental Staff†	6	21	16	...	16	...	...	...	...	...
Corps Artillery — 3 Horse Artillery Batteries ..	21	546	45	504	549	18	...	27	3	30
Corps Artillery — 2 16-pr. Field Batteries ...	13	401	14	300	314	12	...	18	2	20
Corps Artillery — Ammunition Reserve (3 sections).	17	512	19	492	511	...	6	84	9	99
Corps Engineers — Regimental Staff†	2	7	5	...	5	...	...	...	...	...
Corps Engineers — 1 Company and Field Park ..	7	238	13	82	95	...	...	15	...	15
Corps Engineers — 1 Pontoon Troop	9	340	17	226	243	...	...	30	1	31
Corps Engineers — Telegraph Division	7	215	20	156	176	...	...	16	...	16
1 Troop Military Police	2	75	4	66	70	...	...	...	...	...
Foot Police	2	67	3	...	3	...	...	...	...	...
Veterinary Department	6	18	12	...	12	...	...	...	...	...
Chaplain's Department	1	2	1	...	1	...	...	...	...	...
Supply and Transport — 1st Line	8	164	13	154	167	...	2	27	2	31
Supply and Transport — 2nd Line	5	146	6	163	169	...	...	36	1	37
Supply and Transport — Bakery Train...	2	257	2	96	98	...	15	53	1	69
Ordnance Store Department†‡	15	373	17	148	165	...	...	27	2	29
Medical Department. — Departmental Staff† ..	8	23	17	...	17	...	...	...	...	...
Medical Department. — ‡ Bearer Company	6	107	11	44	55	...	20	...	...	20
Medical Department. — 6 Field Hospitals‡	50	450	75	149	224	...	16	60	1	80
Postal Department	3	44	3	...	3	...	...	...	...	...
Total	1,361	37,074	1,803	10,838	12,631	90	392	1,069	60	1,521

* See note to the Table of a Division. † In addition to those included in the General Staff of the Army Corps.

‡ Furnished with horses and drivers from the Commissariat and Transport Department, those for the Field Hospitals being estimated for moving three hospitals at one time.

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CHAPTER V.

CANTONMENTS, CAMPS, AND BIVOUACS.

Troops in the field, speaking generally, may be said to be in three states or conditions:—either (1) on the march, (2) engaged in fighting, or (3) at rest.

Troops under cover whenever possible.

While employed in the first two duties their strength is usually taxed to the utmost. Hence, while at rest, their repose should be so complete that they may regain those powers which the march and battle have temporarily enfeebled. A soldier who, at the end of a heavy day's work, finds a roof of some sort over his head gets a less disturbed night's rest, and is altogether in better case and trim for the next day than if exposed in bivouac to the vicissitudes of weather and wind, and the inherent humidity of the soil.

Bivouacs sometimes unavoidable.

Bivouacs may, in certain circumstances, be unavoidable; but, except there are cogent reasons to the contrary, the men should have a roof over their heads whenever possible. Of course, conditions of climate and the nature of certain countries in which British troops have to operate may cause modifications in this general rule.

The repose of the troops and their health being thus dependent on shelter and the local conditions, it is plain that too much attention cannot be paid by a commander and his staff to the selection of the time and place of the night-halt, and to security from attack while in a state of rest.

In former times, before the present century, it rarely happened that war consisted of an uninterrupted series of operations. Intervals of rest, longer or shorter, alternated with periods of decisive operations.

Tents used up to present century on Continent.

In the Seven Years' War, for instance, the troops were encamped for whole weeks and months; then made some comparatively short movements, and again halted for a time. Moreover, the winter nearly always caused a complete break in the wars of that period; and thus, sometimes by mutual consent, and sometimes without it, there

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occurred a prolonged period of entire cessation from hostilities. These periods of cessation not only served to rest the troops and replenish their expended material, but also to replace casualties in men and horses, and even to organise and train new levies.

But discarded under the new conditions of war.

With the Revolutionary Wars in France, at the end of the last century, came a complete change in the character of, and means of conducting, military operations. Campaigns were prosecuted with greater dash and energy, prolonged interruptions in the military operations ceased, and but brief halts were allowed for the repose of the troops. The armies outgrew the resources of the train to carry tents, and these were discarded. But as the necessity for shelter still held good, the bulk of the force was placed in cantonments or quartered, the inhabitants supplying the men's food. A large burden was thereby shifted from the shoulders of the army administrative services to the country; and the horses, which had under the old system been employed to drag tents and food, now swelled Napoleon's army in the shape of light cavalry.* Recourse was only had to bivouacs when an increased state of readiness for battle was required (for instance, at the outposts), or when large bodies had to be concentrated on a small area (as on the days before and after great battles), when, in fact, the accommodation of the villages did not suffice for housing the troops.

Other continental armies followed the example of the French, with the exception of the Turkish army. The system of bivouacs and quarters thenceforward came into general use.

In the present day, as great an effort as possible from the very commencement, rapidity, energy, and uninterruptedness of the operations, are considered the indispensable conditions of success in war. Consequently, wars are now speedily pushed to a decisive issue; an adverse battle at the outset may affect the whole campaign, and therefore the question of "sparing" the health

* In 1812, we find Napoleon making the great mistake of not adapting his system of conducting warfare to the nature of the country. From the Vistula to the Niemen, the troops were continuously in bivouac. Rapid marches, it is true, were made in consequence, but at what cost to the effective is shown by the ultimate result of that war.

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and strength of the troops until the moment of collision acquires very great importance.

Recent practice with German army in respect of shelter during operations.

During the campaign of 1866 against Austria, and in the Franco-German War, 1870-1, the German troops were generally quartered; sometimes in ordinary, at others in close quarters. When a large force was concentrated in a small area, a compromise between quarters and bivouacs obtained. Every covered building was closely packed with men and horses, and those for whom there was no accommodation bivouacked in the yards, gardens, under walls and hedges, wherever, in fact, protection however slight was afforded against the weather.

Even at the outposts, where fighting was going on, the German troops, in the winter of 1870-1, used the houses in the vicinity for sleeping; for example, at Beaugency, Le Mans, and on the Lisaine.

It was the practice, when the weather became inclement, for all the outposts, except the actual sentries, to be under some sort of cover, otherwise the men simply perished from the cold. Probably the pickets are more liable to surprise under these conditions; but, on the other hand, the farms or villages, in the event of a sudden attack, offer points of support for the defence. In any case, an occasional surprise was regarded as nothing compared with the evil caused by keeping troops continually in bivouac.

Before fortresses.

During the investment of a fortress by the Germans, their main body occupied cantonments; the supports were hutted, and out of the bivouacs of the outposts there gradually grew a quasi-chain of straw shelters and huts.

General conclusion.

It will have been apparent from the foregoing that, with the growth of modern armies and their increased mobility, the tendency has been to discard tents and live on the resources of the country, whether in shelter or food. This is possible, of course, on the continent of Europe, which is favoured by a dense population, abundant resources, and a fair climate; but with those nations whose fighting ground lies under an Eastern sun, and which is often poorly populated and barren, little can be expected from the country itself in respect of food and overhead shelter, and these, therefore, must be carried with the army.

For wars in the East tents necessary.

The principal nations using tents are the Russians, the Turks, the French, and ourselves.

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British troops require, as a rule, tents for any long-continued operations on the borders of India and in South Africa; Russia needs tents in her campaigns in Turkey and Central Asia; France uses *tentes d'abri* for her expeditions in Africa. The Turkish soldier, one of the first to employ tents, still retains them.

The question of tents is purely one of climate and of available accommodation. If they can be dispensed with, all the better, for they add considerably to the train of an army, and it is unfortunately in those countries where tents are indispensable that the difficulties of transport are already great, without requiring to be augmented.

Conditions to be satisfied for troops when halted.

The conditions to be satisfied in the arrangements for troops when halted are (1) rest and comfort; (2) readiness to assemble for the march or for fighting. These conditions are, from their nature, conflicting. Complete rest is only attained by distributing the troops in quarters; but this arrangement, while sparing the strength of the men, scatters them, and a greater or less interval of time for their assembly is requisite. Bivouacs offer the great advantage of compactness and propinquity to the line of march, and therefore of prompt assembly—a quarter of an hour after the order is received, the troops are ready to march—but long continuance without shelter, in indifferent weather, is fatal to men, material, and horses, particularly the latter. Again, the position of troops in bivouac is easily discovered from their fires, by the light reflected on the clouds at night and the smoke by day.

Hence, practically, what is done in continental armies is to place the covering body (outposts or advanced guards) in a modified bivouac, and the main body in cantonments.

Choice between quarters and bivouacs depends on degree of exposure to attack.

The choice between quarters or bivouacs for each constituent part of the force will depend on the degree of its exposure to the enemy's attack, and on the nature of the ground.

Same consideration governs the area occupied by quarters.

The greater the freedom from danger in the case of a body of troops, whether because the adversary is distant, or because it is protected from his attacks by other troops or by local obstacles, the less necessary for that body become rapid assembly and readiness for fighting, and the more comfort and repose can be allowed it during the time of rest, by distributing it in quarters over a wide area. On the other hand, the nearer the enemy, the less is any given

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body of troops secure from his attacks, the more important becomes a rapid change from a state of rest to that of activity, the more concentrated must the men be, and consequently the less comfort and repose is possible.

Nature of country influences extension.

Again, the more densely populated the country in which the troops are operating, and the richer the inhabitants, the more concentrated may be the cantonments, and the greater comforts for the men. On the other hand, in thinly populated and poor countries, the troops must either be very widely scattered or their comfort must be sacrificed.

From what has been said above with regard to contemporary wars, it may be gathered that it is very seldom possible to place the whole force in quarters. But whenever practicable, it should be done. The old proverb must be borne in mind, that "The most miserable village is better than the best bivouac." One great advantage of a quarter over a bivouac is that the men have the use of a fireplace for cooking—a difficult matter in the open, under heavy rain or in a high wind.

Troops are quartered:

In the present day troops engaged in active operations may be placed in cantonments or quarters in the following cases:—

(1) During strategical concentration.

(1) *Before the opening of the campaign*, during the strategical concentration of the troops on the frontier of our own or of an allied State. The cantonments in these cases would necessarily be concentrated, and would be generally determined by the direction of the roads. The main condition here is that the cantonments should be so far from the frontier that they are not liable to surprise; the advanced troops of the covering body should therefore be in bivouac.

As examples of quartering in such cases may be instanced the allied armies before the 1815 campaign; the distribution of the South Austrian Army, Archduke Albrecht, on the river Adige, and of the North Army, General Benedek, in the neighbourhood of Olmutz, before the opening of the campaign in 1866; and the distribution of the 3rd German Army in 1870 before it assumed the offensive.

(2) During operations when exhausted.

(2) *During the operations.*

A. *When the Troops are exhausted.*—Troops which have become exhausted by severe exertions may be sent to the rear, and placed in extended quarters to repose and recruit. Thus, for example, the Grande Armée of

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Napoleon in 1812 was obliged to go into quarters between the Dnieper and the Dwina; as also were both sides—the Allies and the French—at the end of 1813 and beginning of 1814. In the war of 1870–71 the German Army in the middle of December was so exhausted by the efforts it had made, that part of it was forced to move into quarters for rest. The same was done with the troops of the 16th Russian Division in the Crimean Campaign in January, 1855, and with General Gourko's force after the passage of the Balkans in the last Russo-Turkish war of 1877–8.

In unfavourable weather.

B. *On the setting in of severe weather unfavourable for military operations.*

Thus, for instance, in 1807, after the battle of Pultusk, the inclement weather made the roads so bad that the French were forced to go into cantonments. Offensive movements on the part of the Russian army caused them to leave these quarters for a time, but after the battle of Preussisch-Eylau they again went into cantonments behind the Passarge.

During armistice.

C. *During an armistice*, as, for example, in the summer of 1813, when the armies of France and of the Coalition went into cantonments.

In sieges.

D. *During the siege and blockade of fortresses*, as, for example, in the blockade of Mantua in 1796. During the blockade of Metz in 1870 the Germans placed part of their troops in quarters; the remainder were in bivouacs, partly in the open, and partly in huts, tents, and earth-shelters. Lastly,

When beyond danger.

E. *In all cases when the troops run no risk of attack*, that is to say, when they are at a distance from the enemy, or when covered by other troops or by local obstacles.

Thus, in 1809, after the battle of Aspern, Napoleon made use of the Danube, which covered his troops, to distribute them in quarters. In the same way, during the war of 1870–71 the Germans quartered, even though very closely, all troops not immediately exposed to hostile attack. For instance, during the offensive movement to the Saar, after the battle of Wörth, and while there was uncertainty as to opposition in the Vosges, the 5th Prussian Corps was distributed at first chiefly in close quarters, and partly in bivouacs; but in the subsequent marches, after

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the Vosges were passed, and when it was known that the enemy had retired to a considerable distance, the corps began to scatter its quarters more widely for the night-halts. The advanced guard of this corps bivouacked during the earlier marches, but when the 4th Cavalry Division, after passing the Vosges, moved to the front, and thereby covered the rest of the army, the advanced guard also disposed itself for the night-halts in more scattered quarters. From the narratives of the operations of the 2nd Bavarian and other German corps, it is seen that they adopted the same arrangements. It should, however, be remarked that the quartering of large bodies of troops is only possible in a rich and populous country like North-east France.

Troops are bivouacked:

To resume, then, bivouacking, from its presenting but little comfort for the troops, should only be adopted in the following cases:—

(1) When closely concentrated.

(1) When considerable bodies are concentrated in a comparatively small area, and in the closest proximity to the enemy, *e.g.*, before or after an engagement. In these cases it is usually impossible to quarter any troops: all the nearest villages and buildings are set apart for the staffs, or told off for the reception of the sick and wounded.

(2) At the outposts.

(2) At the outposts; but here, also, under favourable conditions, *e.g.*, when some of the rearmost troops of the outposts (supports, reserves) are placed near a village or isolated building, this village or building should be utilised to house the men. This is particularly advantageous in wet, cold, or windy weather.

(3) When no shelter available.

(3) When the war is carried on in thinly-populated, desert, or mountainous countries, where, consequently, the villages are few and small or non-existent, and

(4) In a retreat.

(4) During a retreat with troops showing a want of discipline.

CANTONMENTS.

Classed as (1) ordinary, and (2) close quarters.

In time of war, troops, according to the position of the antagonist and the nature of the country, may have to be

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disposed in quarters over a large or small area—in ordinary, sometimes called extended, or in close quarters.*

Definitions.

By ordinary quarters is understood that to each house of a village are allotted only so many men and horses as can find convenient accommodation, without crowding for the troops or the inhabitants, the latter in some cases providing food; close quarters, when the men are packed as closely as possible, their food being provided by the commissariat. Ordinary quarters, while giving every comfort for the men, hardly ever satisfy the condition of rapid assembly, and therefore are only applicable at a distance from the enemy, or when no danger is apprehended. In all other cases, when the enemy is so near that the troops may have to be assembled at the shortest notice, the quarters must be concentrated.

When applicable.

Dispersion influenced by fighting considerations.

The greater or less dispersion of the cantonments must be determined by the circumstances. Every case will have a separate solution according to the density of the population, but mainly according to the time that can be allowed the troops for concentration at the place of assembly. The question is: How much time does the adversary require from his first appearance to overcome the resistance of the outposts, and reach our outermost cantonments? This interval is the maximum period available for the concentration of our troops. In the same way, when occupying a position, or when before a fortress, the same question arises: In what time can the enemy reach the main position, which we have previously designated for resisting his attack?

Knowing this time, the nature of the ground covered by the cantonments, and the time required to give the alarm and assemble, we can then calculate the dispersion of our cantonments so as to arrive at the selected position with the bulk of our troops before the adversary.

The longer, also, we can detain the enemy by turning the ground to account, the more complete our arrangements within the quartering area for the rapid transmission of orders, and for the speedy movement of the troops to their place of assembly, the more widely may the cantonments be spread.

* The word *ordinary* is here equivalent to the French *ordinaire* and the German *weit*. The word *close* is equivalent to the French *resserrée* and the German *eng*.

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Example.—In June, 1815, the Prussian main forces, not expecting so early an offensive on the part of Napoleon, were so extended in proportion to the distance and strength of the advanced troops that the latter became involved in engagements before they were in a position to contest them, and had to retire to the rearward position at Ligny in order to concentrate.

Nature of quarters will vary with wealth and population of district.

The dimensions of the area for quarters having thus been determined by fighting considerations, the nature of the cantonments, whether ordinary or close, will consequently depend on the number of dwelling-houses, and the nature of the country.

In order to give some idea how this question works out in practice, let us suppose that an army corps of 30,000 men has to be quartered in Belgium, a country where there are 480 inhabitants to the square mile,* or say 100 houses. Let us also assume that strategical reasons require the corps to be assembled in not less than 3 or 4 hours from the time of giving the order. A little consideration will show that to assemble in good time, the troops must not be spread over a greater area than 5 miles in width and 5 miles in depth, or, in other words, of 25 square miles. Consequently, under these conditions, each house will have some 12 men quartered upon it, and the troops will have the comfort of ordinary quarters.

Now take a country like Ireland, with a population of 160 inhabitants to the square mile, or say some 32 houses of an indifferent class. Under the same condition as to assembly, each house will have quartered in it some 40 men, and the troops would find themselves in close quarters.

In the matter of resources, rich countries and those which have been untouched by the military operations, of course furnish more than poor countries and those which have been already traversed by troops. An agricultural population, with its villages and farmsteads, offers generally more in resources and accommodation, especially for the mounted arms and train, than a large industrial town of the same population.

Canton-ment area.

Hence, when making arrangements for quartering a force, it is necessary, in the first place, to consider the

* Average population per square mile (1881)—England, 446; Ireland, 159; Scotland, 122; Germany, 214; France, 180; Belgium, 486; Italy, 252; European Russia, including Poland and Finland, 39.

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Considerations bearing on selection.

strategical position, obtain statistical details of the distribution of the population, and of the resources of the district. Then, in determining the limits of the area, the following considerations must be kept in view.

(1) The cantonments should lie on both sides of the line of operations, and within a distance of not more than 2 or 2½ miles from it.

If the enemy is at a distance, and concentration is not necessary, the depth of the cantonments might correspond with the depth of the marching column, the troops occupying the villages according to their position in the column. In this way the column of march next morning can be formed without unnecessary movements. An army corps, which marches by one road, with a depth of 12 miles and a breadth of 4 miles, an area of 48 square miles, can thus find ample accommodation in a not very populous neighbourhood. The quarters of the Divisions would be one behind the other, the corps artillery probably between the leading Divisions.

This arrangement often avoids great extension away from the road, but, as already mentioned, is not applicable when the enemy is near.

Generally speaking, during strategical concentration, when halted for the defence of a position, during periods of rest, or when the troops are marching by Divisions on separate roads, the Divisions would be abreast, each on its own road, the corps Head Quarters in a central situation, and the whole disposed in a more or less square form.

(2) It is very advantageous if the cantonment area is covered towards the enemy, and also on the flanks, by natural obstacles, either inaccessible or accessible with difficulty.

(3) The cantonment area should offer as great conveniences as possible for an equable distribution, and a rapid concentration, of the troops; it should abound not only in accommodation and roads, but also in the means for feeding men and horses. Thus it is not favourable if local obstacles intersect the area so that communication between one part of the force and the other is impossible or difficult; it is also disadvantageous if the villages in the area are distributed unequally.

Parcelling out area among units.

After the general area is selected, it has to be parcelled out for the different units: Divisions, brigades, battalions,

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administrative services, and so forth. Places for the Head Quarters and the points of assembly in case of alarm must also be selected.

In parcelling out the cantonments to the units, it is necessary to have in view :—

(1) The preservation of the *ordre de bataille* and the integrity of the units, as separation involves difficulties of command and supply; while for each unit the cantonments should extend in depth rather than in breadth.*

(2) To place the Infantry Divisions in front of the Cavalry Divisions, taking care to assign to the latter a locality with abundance of forage and water.

As a rule, in the case of an army corps near the enemy, the Infantry Divisions would be in line abreast facing towards the enemy, or two Divisions in first line, and the third with the corps troops in second line. The cavalry, except that employed in the front for reconnoitring purposes, and elsewhere for orderly duties, would be in villages behind the infantry. The Divisions on the flanks would have their infantry disposed round the mounted arms. The corps artillery, for convenience of stabling, may be sometimes divided among the Divisions and placed in the rearmost quarters, but as cavalry and artillery can come up quickly when required, the cavalry brigade and corps artillery may, if desirable, be sent to a considerable distance in rear; in this event an escort of infantry may be required for them. The trains, in park, behind their Divisions; the regimental transport, of course, with the regiments and corps, and as far as possible stabled. With regard to the supply services, hospitals, &c., they would be on the main arteries of communication (lines of rail, water-routes, main roads), as by these means the magazines are filled and the hospitals emptied.

(3) The troops nearest the enemy should be quartered closely for more speedy concentration.

Places of assembly in case of alarm.

A place of general assembly should be appointed for each Division or independent body of troops (advanced guard, flank detachment, &c.), in some central position, situated at such distance that the enemy cannot forestall them thereon in force, each unit having its own special

* With greater breadth than depth the troops have to make flank marches in order to assemble; always bad, especially in presence of the enemy.

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road. The place of assembly for the troops nearest the enemy would, if possible, be in a position capable of defence, while for the troops in second line, some point should be chosen whence there is freedom of movement in all directions: junction of important roads, and telegraphs.

The foremost troops would generally move to the position at once, while the rearward corps would await orders at their place of assembly. It is not usual to fix an intermediate place of assembly for brigades. Rapid concentration is the main object, and the troops on the alarm should immediately repair to the general assembly of the Division. This does not preclude there being an alarm post for each village, whence the troops would move to the place of Divisional assembly. Each battalion, squadron, and battery would also have its special alarm post or place of parade (quarter-guard for infantry, artillery and cavalry by their horses), and if a battalion, squadron, or battery is distributed among several villages, these units would have a rendezvous fixed for them, generally on that side of their cantonment area nearest to the place of general assembly.

If there is a mixed detachment in a village, the various arms should occupy distinct sections, so as to avoid collisions on the "assembly" sounding; the infantry should, be placed on the side nearest the enemy, and the artillery and cavalry furthest away. When the alarm sounds, the cavalry and artillery would assemble slightly to the rear under cover of the more rapidly concentrated infantry, so as not to impede the latter in reaching the rendezvous, or taking up the defence of the village.

Principles of assignment to different arms.

As regards the assignment of cantonments to the different arms:—

In the area of each Division it is advantageous to assign to the artillery those villages through which pass the best roads to the rendezvous, have an open place for parking the guns, and are most remote from surprise. The Divisional Cavalry, with the exception of any part of it required for reconnaissance purposes, orderly duties, &c., should be in rear of its infantry, and at a spot offering good water and forage. In some cases, to take advantage of the stabling, it may, when the enemy is remote, be distributed among the villages.

Position of Head Quarters and Staffs.

The position of the Head Quarters and Staffs is of great

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importance as regards the rapid issue of orders, and, consequently, for the speedy assembly of troops on the alarm. They should be near the centre of the cantonment area, at a place easily found, for instance at important cross-roads. There should be good inter-communication between one Divisional Head Quarters and another. It is well to have the Brigade and Divisional Staffs in the same spot, provided communication can be equally well kept up between the Brigade and Battalion Commanders. Head Quarters.

On the basis of these considerations a general distribution of the cantonments is prepared by the Staff, while for each village, &c., the detailed distribution is made by the senior officer. Distribution of cantonments.

In the case of an army corps, the Deputy Quarter-master-General would determine the areas for the respective units, subject to the Corps Commander—Divisions, Cavalry Brigade, Corps Artillery, Corps Engineers, and so forth—the places of their Head Quarters, and their points of general assembly. Further, the roads would be indicated by which the units move to the place of general assembly, so as to avoid crossing each other, their distribution on arrival, points where the heavy baggage is to be assembled, and by what roads and under what escort it is to proceed thither, arrangements for maintaining the connection between the Corps and Divisional Staffs, and lastly the general measures for the defence of the cantonment area. Allotment.

Similar arrangements would be made by the Divisional Staffs for the units under their immediate orders—Brigades, Divisional Cavalry, Divisional Artillery, and so forth.

Descending in the scale of command, the question ultimately resolves itself into the occupation of each separate village by a greater or less number of troops. In this there are two cases—either the village, from the number of houses and other covered buildings, is sufficient for all the men and horses, or it is not. In the first case, the village must be divided into sections of proportionate size to the different units.

In the second case, when the village is not large enough, then make use of all the available buildings, and place the remainder in a bivouac outside.

In the selection of quarters the most capacious buildings

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should be chosen, so as to distribute the men and horses in large bodies. Guns should be parked in rear or at the side of the village, but so that they can be freely moved wherever necessary; the men and horses being housed in that part of the village nearest the park. Of the train, only those wagons which are indispensable should be brought into the village; the small arm and gun ammunition wagons, and all superfluous wagons must be placed outside, properly parked and under a suitable guard.

Cantonments before the Enemy's Fortresses.

Necessity for cantonments.

Shelter and rest are particularly necessary for men who have just come off the arduous duty of furnishing the outposts during a siege.

Should be out of range.

The first condition is that such cantonments, unless covered by the ground, should be out of range of the guns of the fortress—say 4 miles. Secondly, that they must not be *deeply* scattered, or the concentration of the troops to resist sorties would be difficult.

Distribution.

The distribution of cantonments should be made in connection with the sections into which the investment is divided.

Observatories.

A well-arranged system of observatories on commanding points, in telegraphic connection with each other and with the Head Quarters of the different sections, should be organised, in order that timely notice may be given of sorties. The distance of these observatories from the enemy's works does not matter, provided that they are furnished with good telescopes. There should also be telegraphic communication between the chief Head Quarters and the Head Quarters of sections, and between the former and the important points of the line of investment.

In the siege of Paris all the observatories were in connection with the Royal Head Quarters at Versailles. By this arrangement, whenever a sortie appeared to threaten, counter-measures could be at once taken, and the points reinforced against which the sortie was directed.

Mode of Estimating Accommodation.

Cantonments for

As regards the number of men that can be quartered

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or billeted on the inhabitants in ordinary cantonments in an agricultural district in Western Europe, it is usual to apportion 4 to 6 men, or even more, to each family; and roughly, for a town or village, the same number of men as there are inhabitants in ordinary circumstances, and twice the number on emergencies. But these figures will not apply to manufacturing towns or mining districts, which, being consumers and not producers of food, will naturally support a much smaller proportion. prolonged occupation

It may also be taken generally that a battalion, battery, and squadron require about the same accommodation; that is to say, the same number of farms that would give shelter to a battalion would also shelter the battery and its horses, or a squadron with its horses.

The men, under these conditions, would have comfortable quarters, and this arrangement would be suited for cantonments intended for long occupation.

But for cantonments on the line of march the men are much more closely packed, for the reason already given: that too much dispersion away from the road entails extra fatigue. So that in this case the calculations must be based on the capacity of the towns, villages, &c., within easy reach of the road, and not on the population per square mile. Cantonments on line of march.

Assuming that quarters should not be further away from the road than $2\frac{1}{2}$ miles, the infantry would have allotted to them the villages on the road, while the cavalry and artillery might be sent to outlying villages, hamlets, and farms.

What was done practically by the Germans on the march in the Franco-German War, was to allot one or more small towns or villages to Divisions, brigades, &c., according to the resources, and then divide the accommodation among the units. This must be done with great precision in respect to boundaries, otherwise disputes will assuredly arise. Then as many men as possible get under cover, while the rest lie in the yards, gardens, sheds, &c., or under lean-to's formed by placing shutters, doors, carpets, and such like, against the walls.

In this way 50 men may be packed in a house, which in ordinary circumstances is inhabited by 5, every barn, passage, and stable being occupied.

When the shelter offered by a village is not sufficient

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for the unit to which it is assigned, the battalions, &c., take it in turn to bivouac.

Mode of estimating accommodation for troops on the march in agricultural districts.

In estimating the capacity of a small town or village and its immediate neighbourhood for sheltering troops on the march, probably the most expeditious way for the Staff Officer is to divide the houses into the three categories—mansions, villas, and cottages—and to form in his own mind an estimate as to their average capacity. The estimate will naturally vary in different countries, according to the wealth of the inhabitants, which reflects itself in their dwelling houses.

In England the classification, according to rooms and accommodation, may be taken as follows :—

(1) Mansions of 14 rooms and upwards; (2) villas of 8 to 12 rooms; (3) cottages of 4 to 6 rooms.

The number of rooms in villas and mansions may be usually guessed by the number of chimney pots, and in the case of cottages by the number of windows. Then, while riding along, count the houses and enter them in a memorandum book under their respective class; also estimate the length of barns, and enter those under a separate heading. If the barns are 20 feet wide there will be room for a double row of horses.

After the calculation of the number of houses in each category, allow for mansions, according to size and the extent of outhouses, 100 to 250 men; villas, 50 men; cottages, 25 men; and 5 feet (or even 4 feet) per horse in the length of barns, including a stable party.

Mansions give proportionately a larger amount of accommodation, in consequence of the longer passages, the outhouses, conservatories, garden sheds, stabling, lofts, &c., all of which can be utilised.

Towns, permanent quarters in.

In towns where there are continuous blocks of houses, and we desire to give the men plenty of room and not to be burdensome to the inhabitants, the following rule may be applicable when there is sufficient time to make a detailed estimate. Strike off the top story for the use of the inhabitants, and for each of the other stories allow 1 man per yard of front if the house is one room deep, and 2 men per yard if 2 rooms deep, and deduct $\frac{1}{3}$ of total for unavailable space, (passage, stairs, &c). For churches, halls, and other large buildings, allow 1 man for every three square yards of superficial measurement. Such an estimate would apply,

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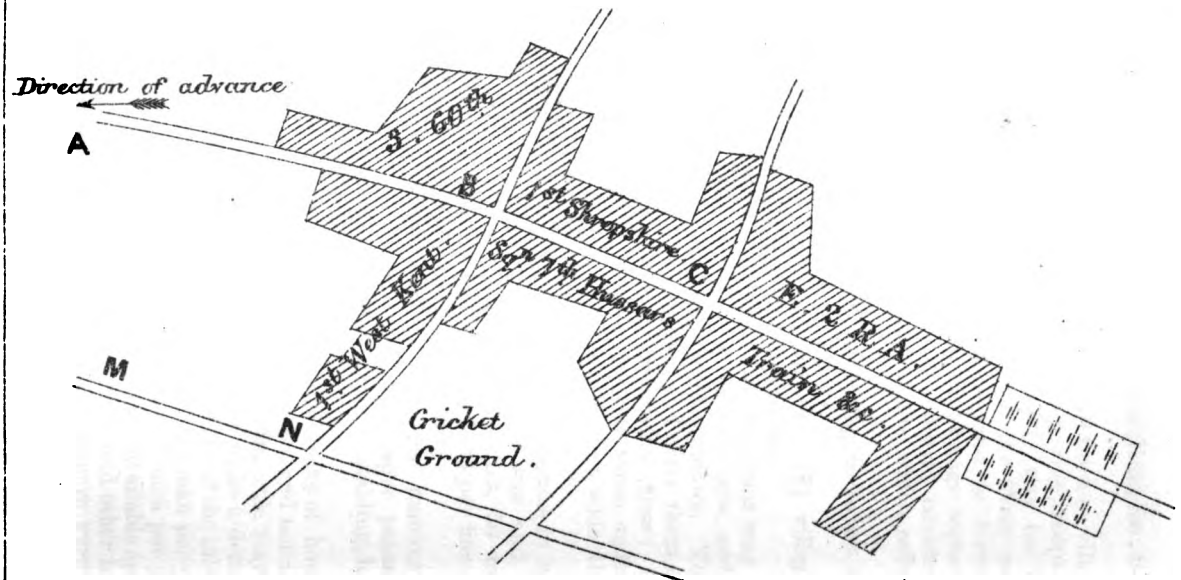
face p. 163.



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for instance, to operations in our own country or in that of an ally.

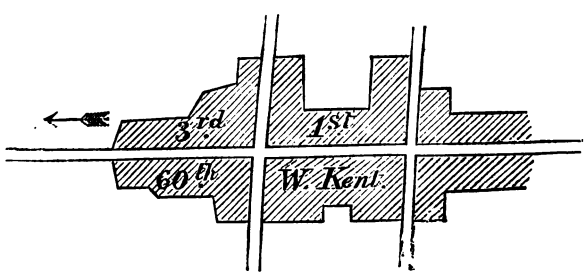
Quarters when on line of march in towns.

In an enemy's country, or on an emergency in England, many more men could be quartered than assigned in the preceding paragraph, as the convenience of the inhabitants need not then be regarded. The sizes of shops vary so much that it is impossible to give an approximate estimate. The only course for a Staff Officer will be to select types of the different shops, and make an estimate after inspection. Then count and make a list as before. The private houses in the town may be estimated under the three classes already mentioned when speaking of an agricultural district. These estimates by types are the only practical means for the determination of available accommodation when on the march.

Allotment of quarters.

In apportioning a town or village to a body of troops on the march near the enemy, the same rules obtain as for cantonments in presence of the enemy, viz., the infantry in front of the mounted arms; the tactical units kept as far as possible intact, and distinct sections of the town handed over to them.

Thus (in the opposite figure), the 3-60th Rifles would form up in the section of the main street AB; the 1st Shropshire in the section BC; the 1st West Kent in the by-street MN; the squadron on the cricket ground; and the artillery and train on their own ground. In this way any collision would be avoided. Should there be no second parallel street, then it would be advantageous to place each of the battalions athwart the main street—one in rear of the other—(as in the woodcut below), so as to reserve a section of the main street for each battalion to form upon and thus prevent collisions.



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The line of boundary for brigades should be well marked, as also for battalions, squadrons, and batteries. The quarters for the mounted men should be near their horses and material, and, if this is not possible, a sufficient party must bivouac near the latter for their care and safe custody.

Each house should be marked with name of unit.

Each house should have marked on the door the number of occupants, the corps to which they belong, and their commander's name. In the same way the officers' quarters should be indicated.* Care should be taken to indicate the Head Quarters, the hospital, and the ration store; above all, there should be no doubt as to the position of the alarm posts, regimental and general. A great saving in time may be effected by having in readiness direction boards with the number of the battalion or the corps distinctly marked, so that, directly an appropriation is made, the corps to which the locality belongs may be known to all.

Direction boards.

It is, of course, understood that each battalion avails itself of the resources of its own section of the town. Should there be a deficiency of water, the wells would be specially distributed among the corps.

When troops are on the march, the quartermasters of the leading troops (*e.g.*, the leading brigade of a division) should proceed in advance and receive over from the Staff Officer the quarter assigned to each corps. They would subsequently conduct the troops thither by the shortest route, meeting them outside the place for the purpose. The troops should not be kept waiting about under arms more than is absolutely necessary after a march.

Form of report on quarters.

In preparing a report on the capacity of a town or village for quartering troops, all the foregoing details of distribution should be considered, and the boundary lines marked on a plan of the place, so that there may be no mistake as to the appropriation of quarters. The form of report might have the following arrangement:—

* Heads of Departments and persons attached to Head Quarters should, in addition, send their addresses to the Adjutant General of the command and, if attached to army Head Quarters, to the Commandant of Head Quarters.

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Report of Quarters available in [here specify locality].

Locality.	Accommodation.		Units to which allotted.	Disposal of remainder of Horses, Guns, Carriages, &c.	Water.		Rendezvous of Units.	Remarks.
	Men.	Horses.			Men.	Horses.		

Measures of Security.

(1) INTERNAL.—In order to protect troops in quarters from hostile attack, it is necessary to take measures for the security of the whole area. Cantonments of main body.

The troops in each village, &c., should have their own special commander, who must know where all the troops under his orders are quartered, ascertain that every man and follower understands the place whither to repair on the assembly sounding, and see to the general safety and order of his cantonment. The quarters of the commander should be indicated in the day time by a coloured flag; at night by a lantern. (See "Encampment Regulations," p. 16.) Each village, &c, to have a commander.

In those cantonments which are not directly menaced by the enemy, a simple guard and an inlying picket will suffice. This guard would furnish the sentries over the guns, treasure chest, prisoners' room, commanding officer's quarters, and over the quarters of suspected persons. At night the sentries should be doubled and the streets patrolled; all persons not connected with the army found in the cantonment after dusk must be made prisoners. Cantonment guard.

In those cantonments more exposed to the enemy's attack (first line, or on the flanks) there should be a larger guard, giving extra posts and patrols for watching the approaches to the cantonments, and for maintaining connection with the neighbouring cantonments in front line.

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Number of guards.

The number of troops on guard would depend on the number of posts, patrols, &c., but, generally speaking, it should be as small as possible, consistent with the duties to be done, as the covering body ought to give the necessary protection.

Inlying pickets.

The inlying pickets will vary in size, and may amount to $\frac{1}{10}$th of the main body.

The sentries and inlying pickets are detailed regimentally, due connection with the sentries of other corps being maintained. They are best bivouacked, but in bad weather may be in large buildings and as near as possible to the alarm post. The alarm posts are arranged regimentally.

Troops at rest.

With regard to the remainder of the troops, *i.e.*, those not on duty, care should be taken that the tactical units are preserved together, and that they should be in that part of the place which they have respectively to defend, and, if possible, that they should be concentrated in large buildings.

Night attacks.

If an attack is made during the night on the cantonments or bivouacs, the "Assembly" should be sounded, and on no other occasion. Every man and follower should know beforehand the point to which he has to repair. To this end every soldier (not on duty) and follower should be marched to his appointed place half an hour after sunset and there dismissed, and if there is likely to be any difficulty, the preparations to meet a night attack should be practised once or twice by day light.

In each house there should be a man on duty to look after the arms and wake the men on the "Assembly" sounding.

Procedure in case of attack.

If the enemy approach the village, the first to meet him would be the guards and inlying picket, which would occupy the most favourable position along the outer border and, if necessary, on the flanks of the village.

Communication between cantonments.

There should be communication between all the villages in the quartering area by telegraph or by signalling; also a service of orderlies for carrying messages.

Cantonments of covering body.

(2) EXTERNAL.—External measures for the protection of the quartering area must admit of timely notice of the enemy's advance in force, and must be so regulated as to

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keep him at bay until the whole or greater part of the troops have gathered at the places of general assembly.

Accordingly the following precautions must be observed:— Precautions.

(1) On all roads along which the enemy might approach in greater or less force, cavalry detachments should be posted, in order to observe with patrols the entire locality in advance and on the flanks, and for the rapid transmission of information. (1) Cavalry on all roads.

(2) On the chief lines of operation by which the enemy may take the offensive, independent advanced guards of all arms should be posted, in order to hold the enemy in check until the main body is in readiness. (2) Advanced guards on lines of operation.

The cavalry should be well in advance, so as to be in contact with the enemy. The amount of cavalry will depend on the length and local peculiarities of the line which it has to watch, not only in front of the quartering area, but on the flanks, so as to avoid their being turned.

The selection of positions for the advanced guards is governed by the same considerations as the selection of defensive positions for the protection of the approaches to a given point; but, it may be added, that in view of better protection for the cantonment area, the advanced guards should be as far forward as possible, and if the roads on which are posted the advanced guards be widely separated, intermediate posts of cavalry should be placed on the intervening roads. Position of advanced guards.

After the positions have been selected, each advanced guard is located either in bivouacs or in close quarters, while the buildings, villages, woods, &c., occupied, and the position itself, are placed in a defensible state. On the latter is posted the *reserve* to the outposts; it does not support the outposts, but they fall back on it. This reserve may be either bivouacked or quartered in suitable villages or buildings.

In each village occupied by an advanced guard more strict measures of precaution are taken than in the villages situated within the quartering area of the main body:— Inlying pickets stronger ($\frac{1}{6}$), connected chain of posts, constant service of patrols, &c.

All information of the enemy is collected at the advanced guards, the chiefs of which send reports to Head Quarters and to the neighbouring advanced guards. For this pur- Transmission of information.

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pose there must be telegraphic communication or a service of orderlies.

The advanced guards will only have with them such wagons of the train as may be indispensable; all the rest should be with the main body.

Bivouacs.

Severity to be mitigated by precautions.

In a previous lecture it has been remarked that the disposition of troops for repose in the open—in bivouac—is advantageous only as regards greater readiness for passing from a state of rest to a state of activity, and disadvantageous in all other respects; that is to say, as regards the comfort and health of the troops. Consequently, bivouacking should only be adopted when the adversary is in very close proximity (namely, at the advanced posts, before or after an engagement, &c.), or when necessitated by the poverty of the surrounding country. If the military conditions, or the want of housing room, compel a resort to bivouacs, then measures must be taken to mitigate as far as possible their severity.

Disadvantages of bivouacs.

The disadvantages of bivouacs depend on the time of year and the weather; and on the period of time during which the troops are kept in them. In summer, on clear, warm, and fine nights, bivouacs are not harmful or very uncomfortable, provided that measures be taken to protect the men from morning chills, dews, and noxious exhalations. On the other hand, in spring and autumn, particularly on rainy, cold, or windy nights, bivouacs may have very serious consequences to troops. Long periods of bivouacs, when the men and horses remain without any shelter, are not only harmful to the health of the troops, but are most destructive to material, clothing, arms, &c. English horses, accustomed to stabling, suffer greatly when placed in the open during inclement weather, and should therefore be stabled whenever possible. The horses of Indian cavalry regiments and Colonial horses, being hardier and accustomed to open lines during peace, may be exposed with greater impunity.

In order to mitigate, however slightly, the disadvantages of bivouacs, the following measures should be adopted:—

(1) Selection of a good site for the bivouac.

(2) A suitable distribution of the troops, train, &c.

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(3) Strict observance of the duties in bivouacs.

(4) Attention and regard on the part of the officers for the men's wants. This is a regimental duty.

Selection of Site.

The selection of the site is in all cases the duty of the Quartermaster General's Department. In this duty the officer of the Quartermaster General's Staff is assisted, if necessary, by a medical officer (generally the Principal Medical Officer), who would give his opinion on the suitability of the position and the general sanitary arrangements.

In selection of site two conditions to be satisfied:

The place should satisfy (1) military conditions, and (2) sanitary requirements, with comfort and sparing the troops.

The immediate circumstances will determine which of these two conditions is to prevail. Thus, if the bivouac has to be selected for some part of the advanced posts, or for the advanced guard, or generally for a detachment in close proximity to the enemy, when a change to a state of activity may occur at any moment, it is plain that the military condition must prevail. On the other hand, the second condition of the convenience of the troops may be considered, if the bivouac has to be selected for a body of troops protected by another body or by a local obstacle; in short, for one which has no fear of an unexpected collision with the enemy, and consequently does not require to pass very rapidly from a state of rest to a state of action.

In this latter case the troops might bivouac in the echelons in which they march. By so doing they will get more room, procure bivouac requisites more easily than in large bodies, be more under observation, and be able to resume the march next morning by a simultaneous movement.

(1) Military.

Military conditions, when within striking distance of the enemy, demand, firstly, that the troops standing in bivouacs should not only be near the position on which they can advantageously meet the enemy, in the event of his attacking, but that they can be moved with rapidity and in good order from the bivouac to the position. Thus, before selecting the site for a bivouac, it is necessary first to select the position, to consider the way in which

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the troops should occupy it for operations against the enemy in different circumstances, and afterwards to determine the roads by which the several units would move in order to take up their place for fighting. Then the nearer each unit is placed to its position, and the shorter and more simple its march to occupy that place, the better.

The preparations for the occupation and defence of the position should be made beforehand, and each commander should know the exact part of the position his troops have to occupy in the event of attack. All obstacles to free communication between the bivouacs and the position should also be removed.

The site for the bivouac may be in front, in rear, on the position itself, or on the flank. The occupation of a bivouac in front of the position is unfavourable, because, in the event of the enemy attacking, the first thing the troops have to do is to move to the rear, perhaps in sight of the enemy, which is very unfavourable generally, and very harmful to *morale*.

A bivouac on the position itself, or to the side of it, has the same disadvantages, although in a less degree. Part of the troops, in any case, when moving into fighting order, will have to proceed to the rear or parallel to the front of the position, offering in the last-named circumstances a flank to the enemy. Moreover at every alarm, even though false, the train is sent to the rear, so as not to incommode the troops—rendering supply difficult.

Therefore it is much more advantageous if the site for the bivouac can be chosen in rear of the position. The front of all bivouacked troops should in any case be perpendicular to their line of operations.

The next important matter, in a military sense, is that troops in bivouac should not be seen by the enemy from afar, and that the surrounding ground should favour the posting of the bivouac guards. The nearer our troops to the enemy, the more does the condition of concealment acquire importance. If the enemy can see the position of our troops, or even the bivouac fires,* he is able to make an approximate estimate of their number, and, knowing how

* The smoke of the French bivouac fires at Gidy and Cercottes, in front of Orleans at the end of November, 1870, was plainly seen about sunset by the Germans from the church tower at Pithiviers—a distance of 23 miles.

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and where they stand, can better prepare an unexpected attack.

For concealment, it is advantageous to place troops on the reverse slope of a chain of heights, in gullies or hollows, behind a village or a wood; all that we have to take care is that, in the case of the advanced posts, these last-named local objects be not very extensive, and not immediately in front of the bivouac, otherwise the men will be inconveniently placed for carrying out their duties.

(2) Sanitary and comfort.

The conditions of comfort and sparing the troops require that the site of the bivouac should be dry, level, and sufficiently spacious; that it should be as much as possible protected from bad weather and wind; lastly, that the requirements of a bivouac should be within easy reach.

Soil.

In respect to salubrity, natural drainage must be carefully looked to, and marshy flats or hollows avoided. A night halt in a damp place or even near one may be fraught with evil consequences to the health of the troops. Upland pasture is good. Arable land (if not newly ploughed), with a gentle slope, is favourable, as it is well drained. Stubblefield, with short clover grass appearing, gives an excellent site; if there is standing corn hard by, so much the better, as the means are at hand for forming shelters. Unenclosed lands, such as commons and heaths, are favourable in summer. Heather is excellent in summer, as it dries quickly, but after long-continued wet avoid the low-lying parts. Meadow land bordering a stream, owing to the morning mists which rise, is better avoided.

Sub-soil.

Sandy or gravelly sub-soils with a gentle slope are the most favourable.

Steep slopes and intersected ground disadvantageous.

It is disadvantageous for troops to have to bivouac on steep slopes or in ground intersected by ravines and watercourses. Besides the inconveniences of the position, such ground hampers the movement of troops in the event of attack.

A bivouac immediately on a high road is to be avoided if possible, as there is not only the dust, but the men's rest is disturbed by the constant traffic.

Protection from weather.

With regard to protection from wind and weather, this is best done by placing the troops to the leeward side of woods, copses, walls, hedges, &c., and avoiding exposed situations. High-growing shady trees keep off wet and dews.

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Medical men are generally opposed to bivouacs in woods, but a thin, high-growing wood, with a good sub-soil, and without undergrowth (*e.g.*, a fir-wood), is generally favourable. Naturally the bivouacs of large bodies of troops should not be scattered in an extensive wood, owing to the difficulty of supervision and command.

Cavalry and artillery in small bodies may find convenient shelter on the border of the wood farthest away from the enemy, provided the ground in their vicinity offers no obstacle to movement, and the wood itself is held by infantry.

The bivouacs of infantry may be advantageously placed next to an already occupied village, which, at the same time, affords shelter from the wind; but it is well to keep artillery and ammunition columns away from villages for fear of fire.

Bivouac requisites.

The condition of propinquity to bivouac requisites is very important as regards the health and comfort of the troops. The main requisites are water, dry wood, and straw.

Water.

Water is of course the primary consideration. It might be possible on an emergency to do without firewood and straw, but water is absolutely necessary. It must be good, sufficient in quantity, and accessible.

With respect to the quality of a stream, &c., find out its reputation from the local population, and then select the swiftly-flowing parts free from decaying vegetation or confervæ.

As regards quantity, there can be no doubt in the case of rivers, canals, lakes, and large supplies of that nature; but with small springs and wells some consideration and measurement are necessary in order to see if the amount is adequate.

Mode of estimating supply of stream.

The volume of a stream or rivulet per minute can be ascertained with sufficient accuracy by observing the rate at which a piece of stick floats down a given length of the course—say 50 or 100 feet—where the cross section remains constant. If the rivulet is deep enough, the stick may be weighted at one end with a lump of clay or a small stone, as a better result will be given, the surface rate and the bottom rate differing in amount owing to the retardation of friction.

After calculating by this means the average rate of the stream in feet per minute, and estimating its cross section

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in square feet, we can compute the volume of water in cubic feet afforded by the stream per minute, and thence infer the number of gallons. Then knowing the number of men and horses to be supplied from the source under consideration, we can determine if the supply be adequate.

Let us take an example.

A Division of Infantry with its transport, in all about 10,000 men and 2,450 horses, is about to take up its quarters on the banks of a rivulet whose dimensions and velocity have been estimated at sectional area ·25 square feet, and current 100 feet per minute. What preparatory arrangements are required?

The men and horses will require—allowing 5 gallons per man and 10 gallons per horse—as the mean day's consumption 75,000 gallons.

The stream yields 1,500 cubic feet,* or 9,375 gallons per hour, so that 8 hours would elapse before the required supply could be obtained. Hence artificial means must be used before arrival to collect the water beforehand, by damming the stream, digging tanks, &c. (see Wolseley, p. 169.) Next day, of course, there would be an ample supply, enough for 2 Divisions if required.

Another important point is the means of access to the water, when from the stream being dammed up and tanks formed, the immediate neighbourhood would become a swamp. In such cases hurdles overlaid with gravel, corduroy work, &c., and other expedients, for which the materials are at hand, may be adopted. Access to water.

It is found that on an average a horse takes about 3 minutes to drink his usual fill—1½ gallon at a time. If there is standing room, therefore, for 50 horses, 1,000 horses could water in an hour. In watering from streams the place allotted for horses must be below that for the men, and the place for washing below that again, with proper water-guards and police to see that the sections of stream are kept for the purposes for which they are intended. The orders to the water-guards should be in writing and strictly carried out.

Modes of filtering water are described in the Regulations for Encampments, and in Wolseley's Pocket-book.

Staff Officers should know approximately the time their divisions or brigades require to water, as sometimes two

* Cubic foot water=6¼ gallons.

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Divisions have to water at the same source, and arrangements have to be made to avoid collision.

Water from wells.

When the water supply is derived from wells the process of delivery is usually very slow, especially if the wells are deep. For instance, from a well 100 feet deep, not at all uncommon in the chalk districts of the south of England, it takes a man 4 minutes to deliver each bucket, working with an ordinary windlass. Assuming the contents of the bucket to be 6 gallons, only 90 gallons can be delivered hourly. On arriving from a march the men require immediately on arrival ½ gallon to quench their thirst and to cook their first meal. Consequently 500 gallons are at once required for a battalion, occupying 5½ hours to deliver from such a well. Hence, when the wells are deep two should be assigned, if possible, to each battalion. After the first demand is over the wants of the battalion will be amply supplied, provided, of course, there is plenty of water in the well.

Watering horses from wells is a slow process; better to use a stream, even if at a little distance.

Springs.

When the water supply is from springs it should be ascertained from the inhabitants whether the source is permanent, as small springs frequently run dry in summer.

Watering arrangements influence the position to be allotted to the mounted services. It does not follow that they should be closest, if unsuitable for other reasons; but their road to water should not cause inconvenience to the rest of the camp.

Staff Officer's reports on camping grounds.

The Regulations for Encampments* describe the precautions and appliances applicable to watering-places, and these have to be considered in reporting on the water supply for camps. Recommendations should be made in the Report as to the most suitable plan to be adopted, and, if possible, a rough estimate computed of the materials, time, and labour required; a calculation should be made of the amount of water available, and the position of the water supply should be carefully indicated on the sketch accompanying the Report.

Wood.

The next point is the supply of wood. A sufficiency within easy reach is an essential feature in choosing bivouac or camping ground.

* Ed. 1883. Pp. 25–28.

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Rough calculation:—Cubic foot of average soft wood makes 10 to 12 rations for cooking purposes.

Fir is particularly well suited; it is easily cut, and burns well. Next come ash, oak, and beech.*

Straw or similar material is useful for making shelters against weather and for bedding. About a ton per company in summer and 2 tons in winter is an ample allowance. Straw.

Distribution in Bivouac.

The selecting of the site for bivouacs devolves on the Staff, as also the decision where the respective arms are to be placed. Combatant troops.

Ordinarily, as for cantonments, the infantry is in front of the cavalry, affording it protection; the latter arm requires much more time than infantry to prepare for fighting or for the march. Hence, being in rear of the infantry, and as it were covered by it, cavalry, in the event of the assembly sounding, may prepare without fear of being disturbed. Of course, if the bivouac is chosen, for example, behind a broad river, or under cover of a strong advanced guard, then, for convenience of supply, the cavalry may be abreast of or in front of the infantry. Artillery should, as a rule, never be separated from the other arms; at the same time, it should be so placed that it can freely and quickly move to those positions which it has to occupy.

Cavalry and artillery being taken at a great disadvantage if surprised, it follows that on the front and flanks of their bivouac the ground should be open; on the other hand, if close ground cannot be avoided, that ground must be occupied by infantry. Cavalry and artillery, if bivouacked away from the other arms, should have a battalion or half-battalion for their protection.

The various units of infantry and cavalry, with their artillery, stand in bivouac in the relative order in which they would be disposed on the position in the event of the enemy's attack; otherwise, in moving to the position, collisions and delays would be unavoidable. Their bivouacs should front towards that side from which the enemy is expected.

* Cubic foot of fir (s.g. ·500) weighs 31 lbs.; ditto of ash, oak, and beech (s.g. ·755) weighs 47 lbs.

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Administrative Departments.

Trains and hospitals are more conveniently placed on the main lines of communication.

The commissariat bivouac, including the officers and men, field bakeries, space for forage supplies, and standing room for the full wagons of the supply train requires a considerable space, if the whole is bivouacked together. It should be in the immediate vicinity of a high road, and accessible from all parts of the bivouacs. In connection with it, but slightly removed, would be the cattle encampment and slaughter-place.

With respect to the position for the non-combatant services generally, they should be near the Division if the enemy is far off; but if he is near, then the commander's object is to keep well to the rear all that can be dipensed with.

Troops should be compact when in bivouacs.

All troops should be as compact as possible in their bivouacs. This is not only advantageous for rapid assembly and formation in fighting order, but is very convenient as regards command and giving orders. But it should be remarked that the conditions of comfort do not allow more than a Division of infantry in one general bivouac; it is more usual to break up the Division into brigades, or even regiments, and assign to each a separate bivouac at a greater or less distance apart, according, generally, to the water supply.

But several small bivouacs preferable to one large one.

Generally speaking, several small bivouacs are to be preferred to one large one, provided they are not so scattered as to interfere with convenience of command. Bivouacs of an entire Division together are seldom seen in warfare.

Bivouacs not in lines if possible.

The bivouacs should not be arranged in lines, one behind the other, if avoidable, as one line suffers from the smoke of the fires of the other, while the first line has to go a long distance to the latrines, and there is less circulation of air. If unavoidable, care should be taken that the lines are at least 150 yards apart, and that there are no latrines between them.

Form of Bivouacs.

Form.

In our Regulations, it is laid down that the form of bivouac should be similar in principle to that established for camps and occupy the same area. Cavalry and infantry should form bivouacs to a flank; artillery, engineers, and

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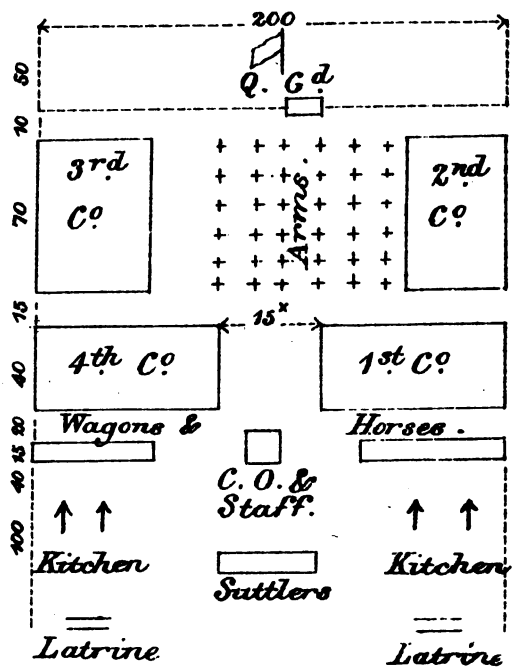
face p. 177.

INFANTRY BATTALION
(GERMAN ARMY.)



Area 200 paces front × 360 deep.

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DANGERFIELD, LITH 22 BEDFORD S^T COVENT GARDEN

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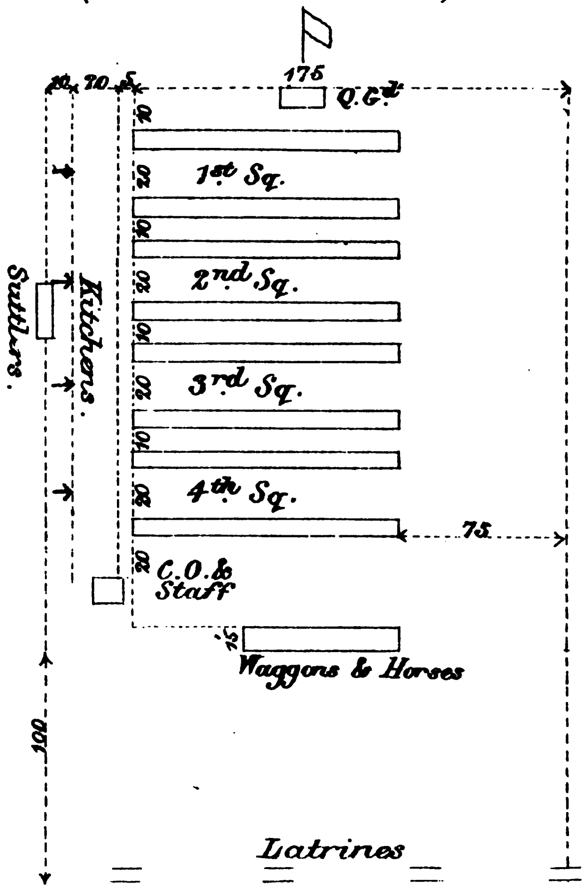
CAVALRY REGIMENT (GERMAN ARMY.)



Area of bivouac 200 paces in front and 260 paces in depth.

DANGERFIELD. LITH 22. BEDFORD S^T. COVENT GARDEN 6793

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transport to the front. Several patterns of bivouac shelter are also prescribed.

Speaking generally, the forms should be such that the entire bivouac can be seen by its commander, and that the men can form rapidly to meet the enemy. Regular and compact forms are naturally desirable, but the outline of the bivouac may follow the curve of a wood or the fold of the ground which gives it shelter.

Should follow natural features.

Infantry.—In some armies the battalion bivouacs in mass behind the piled arms; in others the battalion is bivouacked so as to enclose the arms on three sides. The latter arrangement obtains in the German Army (see opposite plate); it requires rather more space, but the men are better under view. The officers' bivouac is usually in rear or on the flanks of their companies. The bivouac and cooking fires should be close to the men, but regulated by the direction of the wind. The regimental transport either with the troops, or massed at some convenient place in rear, easy of access to all.

Cavalry.—Usually in column of squadrons. Saddlery in front of horse-lines and the men in rear. (See opposite plate.)

Artillery.—Guns and wagons in two lines. Horse lines come next and then the men.

Ammunition Columns are formed like a battery; the wagons being in two lines, at 24 paces distance.

Train are also formed like artillery. Six paces of front should be allowed for each wagon or cart, and intervals of 15 paces between every 10 or 15 carts. Train may be in several lines, with distances between lines of 24 to 30 paces.

In estimating the extent of ground for bivouacs of the train, a very good rule is given in the Prussian Regulations, viz., calculate every 16 wagons as equal to a field battery on the war establishment, and allow only the minimum spaces required for a battery.

It is usual to allow 20 to 40 paces interval between units, and 100 to 150 paces distance between lines in foreign armies. In our Regulation for Encampments, 30 paces is laid down for intervals, and the same or less might be taken for bivouacs.

Intervals between units.

The spaces occupied by units may be taken as the same as for Encampments (Table on p. 180).

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Encampments.

It has been already observed that the circumstances of the wars undertaken by British troops necessitate, as a rule, the use of tents for sheltering men in tropical and sub-tropical climates.*

Observations on "Bivouacs" apply also to encampments.

The observations made under "Bivouacs," pp. 168–177, apply in their entirety to "Camps," with this difference, that as the tent gives shelter against wind and weather, the lines of tents may be arranged with more regularity and on more open ground than bivouacs.

Encampment Regulations of 1883.

The Encampment Regulations of 1883 give full details of the arrangement of camps for most of the units of a British army corps. The arrangement for troops in India is somewhat different in detail, as we shall presently see.

Camps.

Allotment of space

In laying out a camp it is important to know whether it is for one night only or for a longer period; as on that depends the amount of space to be allowed for sanitary reasons, parades, and other purposes.

The general principles with reference to the allotment of space are as follows:—

(1) There must be free passage through the camp, and it must be practicable for the men to assemble quickly under arms clear of the tents.

(2) The arrangement of the tents must afford the greatest attainable amount of order, cleanliness, and ventilation.

(3) The camp should be as compact as possible, consistent with the foregoing conditions.

depends upon area at disposal.

The Regulations of 1883 admit a considerable latitude for discretion as to the spaces to be allotted for the camps of the combatant arms. It is therein recognised that the spaces given to each unit must entirely depend upon the area at disposal.

The plans of encampment given in the Regulations are

* On the borders of India, *e.g.*, the Hazara, Lushai, Duffla, Naga, and Jowaki Expeditions, tents are generally discarded for short operations at favourable seasons.

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those found by experience to be the most suitable, but must not be considered by any means as binding.

Form of camp depends on ground.

"The form of the camp must be suited to the ground, and the different arms of the service should be encamped on that ground best adapted for them. Thus infantry may, if necessary, be encamped on ground with a considerable slope; mounted corps, on the contrary, should be encamped so that the horses may stand on nearly level ground. Wet spots must be avoided as much as possible; this may generally be attained by slightly altering the line of encampment, throwing battalions back in echelon, or adopting such other methods as a little ingenuity may suggest."

Interval between units.

With regard to intervals between units, a normal interval of 30 paces is specified in the Regulations, but in practice much will depend on the amount of ground available, and the space over which the commander desires to extend his force.

The *minimum* interval between units may be stated at 20 paces clear of tent ropes, to admit of free circulation. Between tents, not less than 8 paces.

Any considerable force must usually be encamped in two lines.

Distances between lines.

Between the lines there should be a minimum distance of 100 paces from the rear of the first to the front of the second line. No latrines should be allowed between the lines, unless the distance is much greater than the above.

When the depth is limited, it is better to place battalions side by side and give them a small front, than one behind another with greater front and diminished depth.

Camps in time of peace, or at a distance from the enemy, may of course be arranged entirely with regard to the convenience of the units and supply considerations. In presence of the enemy, the arrangements of the different units are guided by the same conditions as bivouacs, which have been already described.

Units not to be broken up unnecessarily.

Units under one commander should not be broken up unnecessarily. Thus the battalions of one brigade should be together, if there is no good reason to the contrary; and batteries of artillery under one commander. The arrangement is better for discipline, supply, and general convenience.

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The general alignment should be preserved so far as practicable, but regularity of form must give way to other more important considerations.

Spaces occupied by encampments.

The following table gives the sizes of the camping areas for the different units in an army corps on the war establishment, and may be taken as approximately correct in the cases of those units not provided for in the regulations.

Spaces occupied by Encampments.

Unit.	Maximum.		Minimum.	
	Front.	Depth.	Front.	Depth.
Infantry Battalion*	160*	260	64	180
Cavalry Regiment†	244	240	68	300
Artillery Battery	141	175	72	142
,, Divisional Ammunition Reserve	130	200	...	...
,, Corps Ammunition Reserve (one Section) ...	85	200	...	...
Engineers, Field Company	68	200	68	166
,, Pontoon Troop or Telegraph Division ...	100	240	75	190
Medical, Bearer Company (1st Line only)	120	150	...	...
,, ,, (1st and 2nd Line)	120	200	...	...
,, Field Hospital	200	200	200	160
Commissariat and Transport, Infantry Brigade ...	60	155	...	...
,, ,, Cavalry ,, ...	50	210	...	...
,, ,, Divisional, 1st Line ...	60	230	...	...
,, ,, ,, 2nd ,, ...	100	210	...	...
,, ,, Corps Details,‡ 1st Line	100	210	...	...
,, ,, ,, 2nd ,,	110	210	...	...
Head Quarter Camp, Army Corps	120	200	...	...
,, Division	110	110	...	...
,, Brigade (Infantry or Cavalry)	50	50	...	...
Military Police, Troop	60	70	...	...

* The measurements for Infantry are in paces, for all other units in yards.

† Maximum—column of troops in open order; minimum—column of squadrons in close order.

‡ Excluding Cavalry Brigade.

N.B.—Sufficient spaces for parade are allowed in the above maximum calculations.

Camps in Indian Border Warfare.

Indian Camp.

In border warfare in India (*e.g.* Afghanistan) the camp has frequently to be arranged to meet a possible attack from all sides.

A hollow square, with the animals in the centre, is a compact arrangement, and is the form usually adopted by the Russians in Central Asia, but it has disadvantages if the camp is attacked at night. Either the camp must be

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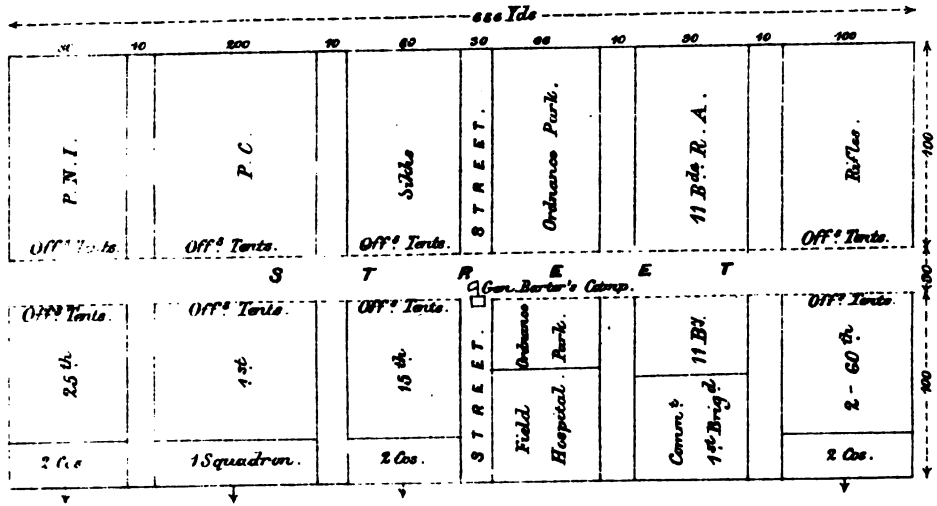
faux p.180.

CAMP OF 1ST BRIGADE IN AFGHANISTAN

(CANDAHAR – CABUL MARCH.)



N.B. The day-latrines were all in rear of the camp. The right-latrines close to the Quarter Guard.

DANGERFIELD, LITH 22, BEDFORD S.

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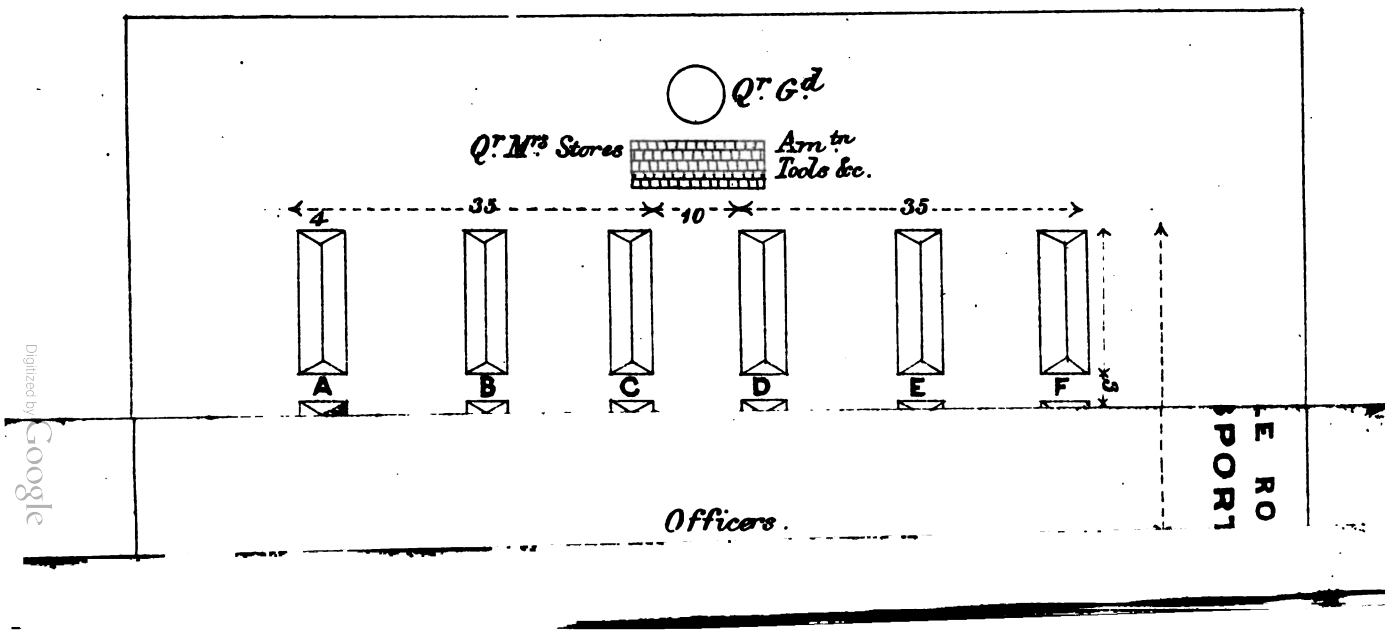

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so extended as to be unwieldy, or so compressed as to make interior movements impossible, and any stampede of animals would cause mischievous confusion.

Afghan Campaign, 1879–80. General arrangement.

The system adopted by the Division* marching from Candahar to Cabul was to encamp the different corps in line, viz., infantry battalions 6 companies in front, two in rear, with baggage animals between; cavalry regiments, 2 squadrons in front, one in rear. Flank battalions had companies also on flank.

General Barter's Brigade, consisting of 2665 officers and men, 1958 followers, and 1964 animals (chiefly camels), was encamped in an area of 686 × 230 yards.

Native Infantry Camp.

The opposite diagram shows the encampment of a native infantry battalion disposed in this way, with plenty of space and wide streets.

In this arrangement, it will be observed that the cooking trenches are close to the men's tents. When contraction is necessary the cooking trenches may be outside. The regimental transport animals are kept near the companies for better supervision; the hospital transport near the hospital tents, and the officers' horses near their owners' tents. The hospital (regimental) tents are placed away from the rest of the troops in consequence of the noise made by the dhoolie bearers; for the same reason the regimental bazaar is relegated to a remote corner.

Spaces occupied.

A regiment of European Infantry was encamped in a space of 100 × 200 yards; a regiment of Native Infantry in an area of 80 × 200 yards; a regiment of Native Cavalry occupied a space of 200 × 200 yards; and a battery of Artillery 90 × 200 yards.

An interval of 10 yards was allowed between corps, and two streets 30 yards broad traversed the camp, intersecting at right angles.

The camps thus faced each way, so as to be more ready against surprise. Round the camp were thrown out the outposts with their pickets and reserves.

The herds went out to graze under a cavalry and infantry escort.

The day latrines were all in rear of the camp. The night latrines close to the quarter guard.

* Commanded by General Sir Donald Stewart (*see* plan facing p. 180).

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Sanitary Arrangements in Camps and Bivouacs.

Strictest observance of sanitary precautions essential.

The strictest sanitary measures are necessary in a camp, as any inattention to these matters soon shows itself in enteric fever, dysentery, and other troublesome ailments. Regiments should be held responsible for the cleanliness of their camps, and for leaving them clean on departure. This is especially important on the line of communications.

Native followers a great difficulty.

In India, native followers are the great difficulty. Being unaccustomed to rules of cleanliness, they speedily foul the ground even in the immediate vicinity of their own tents, and the severest measures (punishment, fine, &c.) are necessary to prevent this practice.

Latrines: their position, dimensions, &c.

Latrine trenches should invariably be made on the *borders of the camping ground*, and in one and the same neighbourhood and under view of the outposts. It is important to bear in mind that the whole of the available camping area may at times be covered with tents, and arrangements for latrines, disposal of litter, &c., should be made in view of such contingency. Hence no matter how small the force encamped, they should have the latrines in the same place as for a larger force.

Although it is sometimes laid down that an old camping ground should not be occupied, this rule is difficult, if not impossible, to observe, for camping grounds are usually determined by the presence of water, supplies, &c., and are not, therefore, capable of this implied variation.

The chief point to observe is to have the latrines dug on the extreme margin of the ground.

Latrines should be from 2 to 5 feet deep, and a foot broad, and should be separate for officers, men, and camp followers. When the hospital tents are pitched, a latrine should be dug for the sick, and, in the event of cholera, a special trench for the immediate burial of choleraic discharges.

The day latrines should be in rear or at the side of the bivouac or encampment, according to the ground and the prevailing direction of the wind. The night latrines (in presence of the enemy) should be nearer camp, and usually in rear of the line of sentries, and on as open ground as

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possible, so that the men going there may not be cut off. The positions should be indicated by flags.

Even when occupied for one day only, the precaution of digging and filling up the latrines should be observed, otherwise the ground becomes foul for the troops next using it.

Dry earth should be thrown in daily, and when the soil reaches to within a foot of the surface the latrine should be closed. In filling up, the earth should be piled and rammed so as to form a mound, in order that the site may be known in case of future encampments. In permanent camps the soil should be regularly carted away and buried some distance from camp.

Refuse pit.

At every cooking place a pit 3′ × 3′ × 3′ should be dug, into which all kitchen refuse, slops, &c., should be emptied, and a layer of earth thrown in every day after the evening meal. The men must not be allowed to throw slops or urinate round their tents. The offal from the butchery should also be at once buried.

All dead animals should be buried or otherwise destroyed.

Carcases of dead animals left unburied are a constant nuisance, and are sometimes found fouling the stream which is the source of the water supply. The streams should be constantly inspected.

The best way to get rid of a dead carcase is to drag it some distance from the road with horses or elephants, disembowel it, and stuff the inside with litter or dry bushes, heap some more over the carcase, and set fire; then bury the charred remains.

Likewise all litter.

The sweepings and litter from the camp should be collected and burnt. The litter may be used as above for burning carcases of dead animals.

Prevention of fouling water supply.

The water serving as the source of supply to the camp must be carefully watched and guarded. Sentries should be posted up stream to see that no horses are watered there, and that the natives do not perform their ablutions in the upper section. When troops are marching daily it is well to have a small water guard accompanying the camp colourmen. The officer of the Quartermaster General's Department would then post guards over the water as required.

Tents to be occasionally struck.

In standing camps the tents of all regiments should be struck once a week, and kept so for some hours in order to air the ground.

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Details of Tentage, by Units (2nd Line).

If Tents and Horse Blankets are to accompany an Army Corps on the march, Carriages, Horses, and Drivers will be detailed from the 2nd Line Departmental Transport Companies in the following proportions, which are sufficient to convey the Tents, with a proportion of Horse Blankets and Surcingles. While so employed they will be administered Regimentally by the Unit to which they are attached.

Arm of the Service.	Number for each Unit.					Totals.				Remarks.
	Regiments, &c.	No. of Tents, each at 81 lb.*	Transport.			Number of Units, Regiments, &c.	Transport.			
			G.S. Wagon.	Horses.	Drivers.		G.S. Wagon.	Horses.	Drivers.	
Infantry	1 Battalion	90	3	12	6	21	63	252	126	
Cavalry	1 Regiment	64	4	16	8	6	24	96	48	
Artillery ...	R.H.A. Battery	20	2	8	4	4	8	32	16	
	Field Battery, 16-pr.	22	2	8	4	8	16	64	32	
	,, 9-pr.	20	2	8	4	3	6	24	12	
	Ammunition Reserve	...	...	...	...	...	...	...	...	No extra carriage required.
Engineers ...	Pontoon Troop	34	1	4	2	1	1	4	2	
	Telegraph Troop, Right Half	22	1	2	1	1	1	2	1	
	,, Left ,, ...	19	1	2	1	...	...	...	...	
	Company and Field Park	30	1	2	1	1	1	2	1	
	Divisional Company	24	1	2	1	3	3	6	3	
Medical Department ...	Staff	15	1 cart	2	1	1	1 cart	2	1	
	Bearer Company, 1st Line	23	2	8	4	4	8	32	16	
	Field Hospitals (2) with Division, 2nd Line	20	...	...	...	...	...	...	...	Ditto ditto.
	,, (6) with Army Corps ...	60	...	...	...	...	...	...	...	Ditto ditto.
Commissariat and Transport Department †...	Staff	7								
	Transport { 1st Line, 4 Companies‡ ...	61								
	Transport { 2nd ,, 4 ,, ...	61	6	24	12	1	6	24	12	
	Supply ... { 1st ,, ...	17					(or 12 carts)			
	Supply ... { 2nd ,, ...	30								
Ordnance Store Dpt.§	... ...	...	...	...	...	...	...	...	...	Ditto ditto.
Military Police ...	1 Troop	7	...	...	...	4	...	...	...	Ditto. They will be conveyed with the Staff Tents.
General Staff...	Brigade... { Cavalry	9	1 cart	2	1	7	7 carts	14	7	
	Brigade... { Infantry...	8	1 cart	2	1					
	Division	28	1	4	4	3	3	12	6	
	Army Corps	40	2	8	2	1	2	8	4	
	Grand Total	...	...	...	...	...	142 ‖ 8 carts	574	287	

NOTE.—The following number of each description of article can respectively be packed in a G.S. Wagon, new pattern, allowing a certain space for bad packing:—
36 Tents. 330 Horse Blankets. 4,000 Surcingles.

* The weight of a Tent is put at 81 lbs., allowing for its being damp; the weight of it is 66 lbs. when dry. Those for hospital purposes are 100 lbs.

† The alterations necessary for the Commissariat and Transport Corps are under consideration.

‡ Exclusive of Transport for 4 Bearer Companies.

§ Includes the Administrative Staff with the exception of those shown under the head "General Staff."

‖ Or 20 Carts and 136 G.S. Wagons.

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*Detail of Tentage, &c. (2nd Line), by Brigades, Divisions, &c.**

	Brigade or Division.	Tents.	G.S. Wagon or Cart.	Horses.	Drivers.	Remarks.
1st Brigade	Staff	8	1 cart	2	1	
	3 Infantry Battalions ...	270	9	36	18	
	Commissariat Department.	6	1 cart	2	1	
			2 carts / 9	40	20	
2nd Brigade	Ditto	284	2 carts / 9	40	20	
Divisional Troops	Staff	28	1	4	2	
	1 Infantry Battalion ...	90	3	12	6	
	1 Regiment of Cavalry ...	64	4	16	8	
	1 Company Engineers ...	24	1	2	1	
	2—16-pr. Batts., Field Art.	44	4	16	8	
	1— 9-pr. Batt., ,,	20	2	8	4	
	Ammunition Reserve ...	...	...	...	...	No extra carriage required.
	Military Police	7	...	...	...	Do. They will be conveyed with the Staff Tents.
	Medical Department ...	43	2	8	4	
	Commissariat Depart.	24	1 cart	2	1	
	Veterinary Department ...	...	...	...	...	Included with Comm. Dept.
	Total 1st Division... ...		5 carts / 35	148	74	
Total 1st, 2nd and 3rd Divisions			15 carts / 105	444	222	
Cavalry Brigade	Staff	9	1 cart	2	1	
	3 Regiments	192	12	48	24	
	Horse Artillery Battery	20	2	8	4	
	Medical Department ...	12	1	4	2	
	Commissariat Depart.	8	1 cart	2	1	
	Veterinary Department	...	...	...	...	Included with Staff.
	Total Cavalry Brigade ...		2 carts / 15	64	32	
Corps Details	Staff	40	2	8	4	
	Corps Arty. 3 Horse Art. Batts.	60	6	24	12	
	Corps Arty. 2—16-pr. Batts., Field Artillery.	44	4	16	8	
	Corps Arty. Army Corps Reserve	...	...	...	...	No extra carriage required.
	Corps Engrs. 1 Pontoon Troop ...	34	1	4	2	
	Corps Engrs. ½ Telegraph Troop..	22	1	2	1	
	Corps Engrs. 1 Company and Field Park.	30	1	2	1	
	Military Police	7	...	...	...	Do. They will be conveyed with the Staff Tents.
	Veterinary Department ...	...	...	...	...	Included with Comm. Dept.
	Medical Department ...	15 / 11 / 60	1 cart / 1 / ...	2 / 4 / ...	1 / 2 / ...	No extra carriage required.
	Commissariat Department	60	2 carts	4	2	
	Ordnance Store Depart.	...	...	...	...	Ditto ditto.
	Total Corps Details ...		3 carts / 16	66	33	
	GRAND TOTAL ...		20 carts / 136	574	287	

* See note, page 177.

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CHAPTER VI.—TRANSPORT BY LAND.

Importance of transport.

Transport is that branch of the military organisation which provides for the movement of an army. On its efficiency and suitable distribution depends the power of that army to execute rapid offensive movements, and the ability, if needs be, to retire without disorder or loss.

Transport must be ready at outset of campaign.

The experience of our wars has shown that it is an all-important matter that the military operations should be conducted with vigour and rapidity, partly, with the object of taking advantage of the favourable season in tropical climates, and partly, to anticipate the enemy gaining strength by delays. To this end, the means of transport should be ready to hand at the outset.

Our difficulties in respect to readiness.

But this readiness is not so easy in practice. The reason is mainly a financial one. Were our circumstances as simple as those of some of the Continental Powers of Western Europe, who are only concerned with the defence of their own or the invasion of their neighbour's frontiers, and therefore make war along excellent roads, we could easily devise a simple transport system, entailing a small nucleus of carriage in peace, with the power, by conscription, of expanding this nucleus for war. Our circumstances are, however, quite different. We may have to defend Great Britain, or may have to take part in a war in Europe. For these obligations some arrangement like that obtaining on the Continent would apply. But in addition to these, we have to contemplate, in the defence of our colonial interests, expeditions to all parts of the earth; countries to which the transport of Western Europe is usually inapplicable.

We find ourselves now in presence of the financial difficulty. No State could afford to lock up its money in the mass of transport suitable for campaigning in every part of the world.

So that on the outbreak of a campaign it happens that the means of transport is not always ready, and delays occur in the starting of the expedition from these shores. Happily, with the circumstances and resources of this country, these delays are not so long or so prejudicial as might otherwise be the case.

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Although the preparation of the means of transport, whether wagons, carts, mules, camels, or whatever it may be, is, for the reason just mentioned, usually deferred until a campaign is decided upon, the *organisation* of the transport for all eventualities can at least be determined in peace. This has been done for the Indian Army in all its details, and a nucleus of transport is permanently maintained there, and arrangements made for its expansion in time of war.

For the army of Great Britain the difficulty is the maintenance of a nucleus. It has been found by experience that we cannot advantageously employ a nucleus of transport, such as we require for colonial campaigns, in time of peace. All that can be done, therefore, in the way of previous preparation, is to determine the organisation for the different cases which may occur, and hold a nucleus ready for the greatest operation in which we are likely to be involved, viz., the employment of one or more army corps in Western Europe. For colonial campaigns we must either trust to obtaining transport from India, or from other countries adjacent to the theatre of war.

A little consideration will enable us to see what nucleus is required.

General principles guiding amount of transport in peace.

In all expeditions there are two elements which enter into the question of carriage: the fixed and the variable. The fixed element is the carriage required to enable the field force to move, and is in proportion to its numerical strength. The establishments of the units being fixed, the weights of their equipments, baggage, supplies, &c., are known, and there is no difficulty in determining the amount of carriage, regimental and departmental, necessary to move them, whether that carriage be on wheels, men's backs, or pack animals.* The variable element is the carriage necessary to keep the force supplied with necessities and relieved of superfluities—the general transport on the line of communications; its amount will vary with the length of the line, the nature and resources of the country, and the scope of the operations.

* It is very desirable that a maximum scale should be laid down for each branch of the service, including staffs and the numerous officers attached thereto in time of war. The maximum load to be carried in each conveyance should be fixed, as also the minimum number of animals required to draw such loads over bad roads.

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Evidently our arrangements in time of peace can only contemplate the transport with the troops, and, with regard to the transport on the line of communications, they will suffice if they furnish a moderate nucleus.

Transport of two kinds in war:

Transport with an army in the field then consists of two main parts: (1) Transport with the field force; and (2) Transport for the line of communications.

(1) Transport w th field force.

The transport with the troops in the field should be a disciplined body, with a military organisation as near akin to that of a regiment as possible. This dictum has been upheld by all the great commanders of the present century, without going back to former generations, and the present mode of conducting war, rapid mobilization and sharp speedy blows, affirms it. Further, the transport assigned to the different units of the field force should belong to those units, and should not be liable to be taken away temporarily for any but emergent duties, and then only by the order of the General Officer in command.

(2) Transport on line of communications.

For the general transport working along the line of communications, from the base to the advanced depôt inclusive, and therefore generally out of reach of the enemy, a strictly military constitution is not so necessary, but it should be at least organised into sections and supervised by cadres of Officers, Warrant Officers, and Non-Commissioned Officers with native subordinates. The employment of this transport on the line of communications is in the hands of the Commissary-General, acting under the orders of the General of Communications.

Transport with field force at any rate should be Government.

It may be further stated as a broad guiding principle, that the transport with the troops in the field should be as far as possible the property of Government; while the transport working along the line of communication may be mainly hired, the usual proportion being one-third military and two-thirds hired.

Hired transport, conditions of its successful working.

In the Afghan Campaign it was frequently found that, when hired transport was employed with troops in the front and the animals of any individual had to be broken up into fractions and sent in different directions, the owner raised difficulties and the service was impeded. Hence it is recommended that hired transport should be employed only on the line of communications, and, as far as possible, in the district in which it is procured. It is then worked under the most favourable conditions.

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TRANSPORT WITH THE FIELD FORCE.

The transport accompanying the field force is distinguished as (1) regimental, and (2) departmental.

(1) *Regimental transport* is that permanently assigned to the combatant units in such proportion as to carry their equipment, reserve ammunition, tools, baggage, necessaries, and one day's food; and is capable of division if required among the component parts of the unit.* The horses and wagons are assigned from the Commissariat Department, but the transport officers and drivers belong to the regiment. (1) Regimental transport. An integral part of regiments.

When not actually required for marching purposes, the regimental transport is to be considered available for service of a general kind, either wholly or in part, at the discretion of the brigadier, general of division, or general officer commanding the army corps. And can only be temporarily removed by order of the General.

A British battalion on the war footing has twelve regimental transport carriages as follows:— Transport of a battalion.

No. 1. Staff purposes generally, artificers' tools, books, &c.
No. 2. Quartermaster's stores, butchery implements, &c.
No. 3. Tool cart (150 picks, 150 shovels, 17 axes, 42 bill-hooks, and sundry tools).
Nos. 4, 5, and 6. Small-arm ammunition carts.
Nos. 7 and 8. One day's rations and corn.
Nos. 9, 10, 11, and 12. One wagon for every two companies (camp kettles, blankets, axes, officers' baggage, books, and two stretchers each).
Of these Nos. 3, 4, 5, and 6 are two-horsed, the remainder are four-horsed.
Additional for tents when carried.—three four-horsed wagons.

A British cavalry regiment has 10 carriages:— Transport of a cavalry regiment.

Only one S.A.A. cart and a field forge instead of a tool cart. The remainder same as for infantry. All four-horsed.
Additional for tents when carried†—four four-horsed wagons.

A battery of artillery has 4 wagons, viz.:— Transport of a battery.

* If tents and other 2nd line equipment are ordered to be carried, the necessary departmental carriages with drivers and horses, are assigned in addition from the commissariat department, and when so attached are administered as regimental transport.

† Assigned from Second Line Departmental Transport.

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One forge (6-horsed), 1 store limber (6-horsed), 1 store wagon (6-horsed) for stores, and 1 store wagon for supplies (4-horsed).
Additional for tents when carried*—two four-horsed wagons.

In movements by rail or sea, the regimental transport is usually entrained or embarked with the troops, so that on arrival at their destination the fighting units may be able to move at once.

The advantages of having a transport permanently attached to a regiment are that it is personally interested in the safe custody and delivery of supplies, equipment, and stores; that the reserve ammunition is always where it is needed; the camp equipment up in time; the rations obtained from the Commissariat with regularity and despatch. It knows the exact position of its own corps and its requirements.

The chief objection to regimental transport is that it withdraws from the regiment a certain number of fighting men, and *pro tanto* diminishes its offensive power.

Another objection is that when the troops are halted, it is not always easy to work regimental transport to the best advantage for general purposes, owing to the objections raised by regimental authorities to this extra work.

(2) Departmental Transport:

(2) *Departmental transport* is that part of the transport which is specially assigned to the staff and departments (medical, commissariat, ordnance store, &c.) The horses, wagons, officers, non-commissioned officers, and men belong to the Commissariat and Transport Corps.

Its classification.

It is classified into (*a*) First Line; (*b*) Second Line; and (*c*) Advanced Depôt.†

The main distinction between these is that the First Line is entirely military, the Second Line partly military and partly hired, while the advanced Depôt Transport is entirely local transport. Their respective duties are as follows:—

(*a*) The 1*st Line Departmental Transport* conveys the baggage and equipment of the Army Corps, Divisional and Brigade Staffs, furnishes the transport of the Bearer Companies, Military Police, and Commissariat and Transport

* Assigned from Second Line Departmental Transport.
† See Tables, pp. 185–6.

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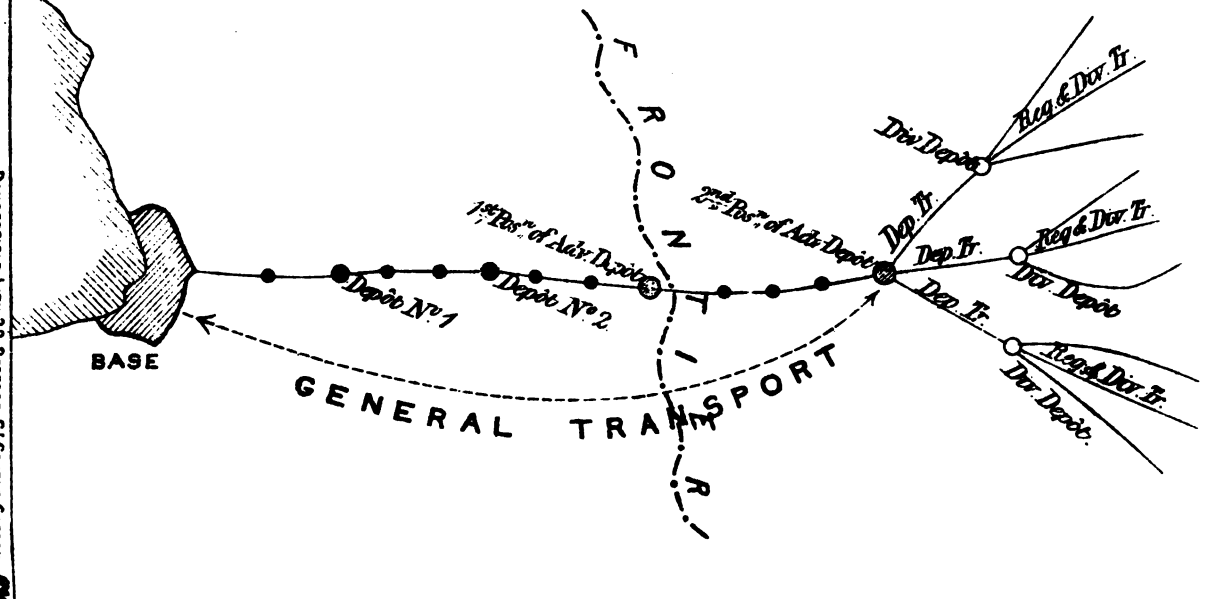
face p. 191.

SKETCH SHOWING THE WORKING OF TRANSPORT

on the line of Communications.



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Department, and carries one day's rations and oats for the Army Corps.*

(*b*) The *Second Line Departmental Transport* carries another day's supplies of rations and oats for the Army Corps, furnishes the transport for the Divisional Hospitals, for 3 of the 6 Corps Hospitals,† and for 30 tons of reserve stores of the Ordnance Store Department.

(*c*) The *Advanced Depôt Transport* finds horses for the bakery train, and also includes sufficient locally procured transport to convey at least four days' supplies of rations and oats.

In conveying supplies from the advanced depôt to the troops in the field, the divisional depôts work back with their departmental transport to the advanced depôt, while both regimental and departmental transport work between the divisional depôts and the troops. (*See figure opposite*).

In the Expedition to Egypt in 1882 the regimental transport for a battalion of Infantry consisted of :— Transport in Egypt 1882. Regimental.

2 riding horses 26 draught animals 21 pack ditto 2 water carts 10 carts	Carried two days' rations and forage, fuel for one day, cooking utensils for Officers and men, butchery implements, intrenching tools, stretchers, signalling and picketing gear, 30 rounds reserve ammunition per man (carried on pack animals.)

The 1st Line Departmental Transport consisted of 5 companies Commissariat and Transport Corps :— Departmental.

In all 800 riding and draught animals,
122 pack animals,
291 carts,
887 Non-Commissioned Officers and men,
13 Officers and Warrant Officers,
Leaving 237 animals to be supplied locally.

* The mobilisation scheme contemplates that the 1st Line Departmental Transport should be expanded from the peace to the war footing by calling in reservists of the Commissariat and Transport Department, while the 2nd Line should as far as possible be expanded from the same source, with the necessary additions from local sources, but retaining a military organisation.

† Transport for three only is provided, as it would be exceptional to move more than that number on one day.

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General.

The general transport for 2nd Line and base consisted of three companies of Commissariat and Transport Corps as cadres for 6 companies, of the following total strength:—

12 officers,
24 conductors,
258 Non-Commissioned Officers and men,
3,600 animals,
250 carts,
1,500 native drivers,
150 head-men, interpreters, and artificers.

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Table showing Distribution of Departmental Transport to an Army Corps (Mobilisation Tables).

Distribution.	Officers and Men.			Animals.			Carriages.					
	Mounted.	Dismounted.	Total.	Riding.	Draught.	Total.	2-horse carts.	Wagons. 2-horse.	Wagons. 4-horse.	4-horse Ovens.	Local Auxiliary Wagons.	Total.
1st Line.												
Divisional Details.—1st Division—												
Baggage and equipment of Staff, butchery implements, one day's (1st) provisions and forage for Divisional Details, Military Police, and Com. and Trans. Detachment, H.Q. and 1 Section	72	17	89	13	92	105	...	1	20	...	...	21
Bearer Company ... ... 1 Section	62	...	62	4	86	90	3	14	...	...	23	40
Each Brigade—												
Baggage and equipment of Staff, butchery implements, one day's provisions and forage for Brigade ... ... 1 Section { 1st Brig.	39	10	49	4	44	48	1	1	9	..	...	11
1 Section { 2nd Brig.	39	10	49	4	44	48	1	1	9	...	...	11
Total for 1st Line of 1st Division	212	37	249	25	266	291	5	17	38	...	23	83
Total for 1st Line of 3 Divisions	636	111	747	75	798	873	15	51	114	...	69	249
Corps Details—												
Baggage and equipment of Staff, butchery implements, Com. and Trans. Detach., ½ Bearer Co., Mil. Police, Reserve of Transport for 1st Line H.Q. and 1 Section	56	9	65	9	72	81	2	8	5	...	12	27
	46	...	46	4	20	24	...	...	3	...	...	3
One day's (1st) provisions, &c., for Corps Details 1 Section	68	13	81	5	94	99	...	...	21	...	...	21
Cavalry Brigade—												
Baggage and equipment of Staff, butchery implements, one day's (1st) provisions and forage for Brigade, ½ Bearer Co., Com. and Trans. Detach. ... ... 1 Section	85	11	96	6	124	130	2	8	17	...	11	38
Total for Corps Details, 1st Line	255	33	288	24	310	334	4	16	46	...	23	89
Total 1st Line	891	144	1,035	99	1,108	1,207	19	67	160	...	92	338

N.B.—As this Table applies only to Europe, no provision is made for the conveyance of fuel and hay.

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Table showing Distribution of Departmental Transport to an Army Corps—continued.

Distribution.	Officers and Men.			Animals.			Carriages.					
	Mounted.	Dismounted.	Total.	Riding.	Draught.	Total.	2-horse carts.	Wagons. 2-horse.	Wagons. 4-horse.	4-horse Ovens.	Local Auxiliary Wagons.	Total.
1st Division— 2ND LINE.												
One day's (2nd) provisions, &c., for Division, Com. and Trans. Detach. ... ...H.Q. and 1 Section	90	29	119	11	134	145	...	...	32	...	...	32
Two Field Hospitals ... ... } 1 Section	64	...	64	2	92	94	4	2	12	...	8	26
2nd Division— Two Field Hospitals ... ... } 1 Section	62	...	62	2	92	94	4	2	12	...	8	26
One day's (2nd) provisions, &c., for Division, Com. and Trans. Detach. ... ... 1 Section	90	29	119	8	134	142	...	...	32	...	...	32
Total for 1st and 2nd Divisions, 2nd Line	306	58	364	23	452	475	8	4	88	...	16	116
3rd Division— Two Field Hospitals ... ... 1 Section	63	...	63	4	92	96	4	2	12	...	8	26
One day's (2nd) provisions, &c., for Division, Com. and Trans. Detach. ... ... 1 Section	92	29	121	7	134	141	...	...	32	...	...	32
Cavalry Brigade and Corps Details— One day's (2nd) provisions, &c. (including Veterinary Department) ... ...H.Q. and 1 Section	115	29	144	12	154	166	...	...	37	...	...	37
Total for 3rd Divn., Cavalry Brigade, and Corps Details, 2nd Line	270	58	328	23	380	403	4	2	81	...	8	95
Total 2nd Line	576	116	692	46	832	878	12	6	169	...	24	211
Total for Army Corps, 1st and 2nd Lines	1,467	260	1,727	145	1,940	2,085	31	73	329	...	116	549
Line of Communications—												
Advanced Depôt ... ... H.Q. and 1 Section (Bakery Train)	71	231	302	17	86	103	15	...	13	41	...	69
Six Field Hospitals (horses for three only) ... ... 1 Section	107	...	107	4	146	150	13	6	37	...	24	80
Ordnance Store Department ... ... 1 Section	84	...	84	5	126	131	...	...	29	...	...	29
H.Q., L. of C., Intermediate Depôts, General Transport, and Base. Formed into as many Sections as necessary	433	324	762	136	448	584	8	6	105	...	...	119
Total Line of Communications and Base	700	555	1,255	162	806	968	36	12	184	41	24	297
Grand Total for Army Corps with Line of Comm. and Base ...	2,167	815	2,982	307	2,746	3,053	67	85	513	41	140	846

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As already remarked, the Regimental transport is looked after by the men of the regiment, while the Departmental transport is in charge of officers and men belonging to the Commissariat Department. In order that those in charge of transport should be efficient in war, it is very necessary that they should have constant training in time of peace.

Necessity for training soldiers to transport duties in peace.

On this point the Senior Transport Officer with General Sir F. Roberts' force during the march from Cabul to Candahar reported very strongly :—*

"I consider it doubtful if General Roberts could have completed his march to Candahar in the time he did, had he not for months previously insisted on regiments as a body, and soldiers individually, learning something of transport work."

The Senior Transport Officer† with the Indian Contingent of the Egyptian Expeditionary Force reported as follows :—

"Breaks-down on the march were rare, owing to regiments having been instructed carefully in packing and loading tents, kits, &c." And again, "The fitness of the transport in this campaign is due to having a superior class of native groom, with trained native Officers, and good European Conductors and Non-Commissioned Officers."

Having described the allotment of the transport to the different arms and departments, let us now consider how this transport should be distributed on the march and at the halt, so as to impede the mobility of the field force as little as possible.

Separation of transport on the march an important question.

The transport with the field force consists, as we have seen, mainly of baggage, hospitals, reserve ammunition, supplies, engineer park, pontoon and telegraph troops, auxiliary charitable ambulances, treasury chests, &c., and sometimes a siege train. It is evident that we have here resources calculated to last for several days, and to meet the losses caused by serious engagements. To keep this mass of carriage with the troops, whether on the march or in quarters, not only embarrasses them, but in the presence

* Colonel Low, of the Bengal Cavalry, to whom was entrusted the responsible duty of carrying into effect the new system of Transport Organisation for India.

† Colonel Hayter, Madras Staff Corps.

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of the enemy is absolutely dangerous, and may lead to disaster.

Principles of the separation.

The main principle to be observed is to have the transport within easy reach of the army, without hampering the latter at all times by its presence. To secure this, the transport must be distributed methodically into suitable divisions or echelons, following the marching troops at convenient distances.

Transport may, for marching purposes in the theatre of war, be classed as (1) baggage, and (2) trains.

(1) The *baggage* includes all that is required for the daily wants of the troops (food, 1st reserve of ammunition, tools, and night covering); it marches with them, and joins them at the night halt.

(2) The *trains* (2nd reserve of ammunition, field hospitals, supply train, &c.), move well in rear of the marching column, and remain at night in some place in rear, easy to defend and easy of egress.

When a fight is imminent, the baggage is separated into (*a*) *combatant or light baggage*, consisting of the ammunition, tools, &c., moving with their respective battalions in the fighting column; and (*b*) *non-combatant or heavy baggage*, consisting of the kits, food, &c., required only at the night halt, and therefore kept in rear altogether of the fighting column. While the trains would also be divided into two parts, (*a*) *1st Section*, consisting of the trains likely to be required for the purposes of the fight, and (*b*) *2nd Section*, embracing the remaining trains.

This distribution in practice can be best illustrated by taking some examples, as this is an important matter for the Staff officer.

Distribution and order of march of transport

The distribution and order of march of transport requires different treatment according as to whether—(1) the enemy is beyond striking distance; or (2) the enemy is near, and may be encountered at any moment.

In the first case, the comfort and convenience of the troops, speaking generally, may be allowed to regulate the distribution and order of march. In the second, everything must yield to fighting considerations.

Let us take the second case first, as being the more important, and afterwards note any modifications in favour of comfort permissible when the enemy is beyond striking distance.

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First Example.—Let us suppose a British Division on the war establishment to be moving independently by a single road, and to be covered in front by an efficient screen of cavalry (see Plate facing page 100). Illustrated by examples.

The following arrangement appears a reasonable distribution of its baggage and train:—

(1) LIGHT BAGGAGE (*i.e.*, the baggage following immediately after the troops wherever they go, into action, &c.)

Led horses, regimental ambulance,* and entrenching tool carts (No. 3 of Regimental Transport) following their respective battalions.
S.A.A. carts (Nos. 4, 5, 6 of Regimental Transport), as a rule, in rear of brigades, advanced guard, &c., as the case may be.
Battery ammunition wagons in two echelons:—
1st echelon—3 ammunition wagons and the forge limber wagon following the guns.
2nd echelon—3 ammunition wagons at tail of advanced guard, main body, &c.†
Engineer wagons—so many as required, with tools and materials, following the Company.
1st Line wagons of ¼ Bearer Company at the tail of advanced guard.‡

(2) HEAVY BAGGAGE, consisting of what is required at the night halt, marching under the superintendence of the Divisional and Brigade Baggage Masters, escorted by the Military Police and Baggage Guards,§ and in the same sequence in order of march as the troops.

Rest of infantry regimental transport (Nos. 1, 2, 7, 8–12 wagons) massed by brigades.
All cavalry regimental transport, except small-arm ammunition cart and forge wagon, which might sometimes be wanted with the regiment.
Three remaining wagons of each battery of the Division.
Staff Baggage—divisional and brigade in proper sequence.
Commissariat supplies for Staff.

---

* The Battalion Surgeon, with his 8 stretchers, pack animal with panniers, &c.

† The three remaining wagons of the battery—store limber and 2 ammunition and store wagons—would be with the heavy baggage.

‡ The other ¾ Company and its 1st Line wagons with the main body.

§ A baggage guard might consist of 1 Non-commissioned Officer and 4 men per battalion. These, with the foot and mounted police, ought to suffice to protect the Heavy Baggage and 2nd Section of Train.

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The Heavy Baggage, with the 2nd Section of Train (*vide infra*) would either follow the main body at a distance varying from 4 or 5 miles to half a day's march, or else be halted at some convenient spot until the result of the fight is known. If the result is favourable, it is ready to be brought up to the troops; if unfavourable, it has gained so much ground of its rearward march. The spot selected for halting should allow of parking and retreat in various directions, with plenty of adjacent open ground, or be situated behind some natural obstacle. Trains should never be brought through a defile, if one exists. Troops should always know where their trains are.

(3) TRAIN (1ST SECTION), consisting of so much of the train as will probably be required during the fight, viz.:—

Divisional Reserve Ammunition Column.
Divisional Hospitals.

The 1st Section of Train might follow the main body at a distance of a mile or so, and would halt for further orders when the action commences. It should be escorted by a small force of infantry from the main body, and be under the orders of the Officer Commanding Divisional Reserve Ammunition Column.

(4) TRAIN (2ND SECTION), consisting of the train not wanted during the action, viz.:—

2nd Line Bearer Company.
Rest of 1st Line Departmental Transport.
2nd Line Departmental Transport.

The 2nd Section of Train would march with and follow the heavy baggage, under escort of the Military Police.

Variation from above.—If no action is probable, the heavy baggage might follow the main body at a distance of 1 to 3 miles, while both sections of train might remain at a distance not exceeding half a day's march from the tail of the main body. Tool carts and small-arm ammunition carts may also in some cases be sent to join the heavy baggage.

Second Example.—An army corps moving with a Division on each of three parallel roads, with an efficient cavalry screen in front. Fight probable.

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In this case the Pontoon Troop and Telegraph Troop would, if likely to be required during the day, be with one of the Divisions; otherwise, with the 2nd Section of Train. The Corps Artillery would march with one of the Divisions.

The Light Baggage and 1st Section of Train with each Infantry Division, as in the preceding example.
The Heavy Baggage of the three Divisions and Corps Details would be massed in some convenient spot half a day's or a day's march in rear, together with the 2nd Section of Train.
The 2nd Section of Train would consist of the Divisional Trains already enumerated, and in addition those of the Corps Details:—Corps Ammunition Reserve, Corps Field Hospitals, Engineer Company and Field Park.

Variation from above.—If no fight in prospect, the Heavy Baggage might follow the Divisions,* as in the first example, while both Sections of Train of the whole Army Corps might move together by the best road, or the one most secure from the enemy.

Third Example.—The same conditions as before, but the Army Corps is moving by one road.

When a fight is imminent, Light Baggage with Divisions. Heavy Baggage in order of Divisions, and halted half a day or a day's march in rear. 1st Section of Train following respective Divisions, as in the *First Example*. 2nd Section of Train (Divisions and Corps Details) massed in rear with the heavy baggage at a convenient spot.

Variation.—When no fight imminent, the Heavy Baggage may follow the respective Divisions, as in the modification of the First Example. Trains (1st and 2nd Sections) of each Division and of Corps Details in rear of whole column and in proper sequence.

Transport on the Line of Communications.

In the conveyance of supplies along the line of communications, the regular transport must be assisted as much as possible by *general transport*, purchased, requisitioned, or hired locally. The whole of this transport is

On line of communications regular transport is largely supplemented.

* The heavy baggage of any part of the corps details moving with the Division would be with the heavy baggage of such Division.

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mented by local transport.

placed in the hands of the Senior Commissariat Officer on the line of communications, who receives his instructions as to its disposal from the General of Communications. The latter would appoint, if he thought fit, combatant officers as Directors of Transport.

Supervision is military.

The drivers, &c., would probably be in most cases the inhabitants of the country, hired for the occasion with their animals and wagons, but the supervising staff should consist of officers, non-commissioned officers, and men of the Commissariat and Transport Department.

To maintain the supplies of the army in front, and to remove from the front the superfluities, in the shape of sick and wounded, it is very advantageous if there is either a railway, river, or canal available.

A line of railway is the best of all means for meeting these requirements, but it is liable to be temporarily obstructed, and it may not always lead in the direction in which the advance is made. Hence it can only be counted upon to supplement other transport moving by the ordinary roads.

Three systems of forwarding supplies along line:

Let us suppose the absence of a railroad.

The supplies are forwarded from the base to the advanced depôt by one of the following systems:—(1) Convoy; (2) Staging; or a modification of the latter called (3) the Meeting system.

(1) Convoy.

In the *Convoy system* large sections of transport move from the base to the advanced depôt, returning the whole distance back unladen to receive a fresh load after an interval of many days.

(2) Staging.

In the *Staging system* the entire distance is divided into approximately equal parts or stages, the same section of the transport always working over the same part of the road, going laden and returning unladen.

(3) Meeting.

The *Meeting system* is when two sections, one laden, the other unladen, work in conjunction, and meet daily at a fixed point halfway, where the loads are transferred.

Their respective merits considered.

In direct convoys the labour of the animals is continuous, whereas by the staging system the animals perform the return journey without a load every other day.

As a staging system requires a certain time to arrange, the first advance of the army is usually accompanied by large convoys. It moreover demands the goodwill of the inhabitants, and freedom from attack and annoyance, so

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that well-guarded convoys are preferable when the line of communications passes through a hostile and difficult country. Convoys are also necessary when a flank or rearward movement necessitates a change in the line of communications, or the hasty removal of magazines.

With the convoy system the expense in establishments is less; there is less pilfering and less damage to the stores.

In the staging system an officer is required at every station, or every two stations, also an establishment of clerks and subordinates; whereas in the convoy system an officer proceeds in charge of a division of 1,000 animals, and requires but a small subordinate establishment.

Damage to stores and pilfering is difficult to detect with the staging system, as the stores change hands so often. To obviate this as much as possible, the same "supercargo" or set of conductors should go through with the stores. Any discrepancy then becomes a matter of inquiry between the consignee and the "supercargo."

In the convoy system the officer taking over the stores has a cart-roll showing the name of the driver to each cart. The same set of carts and drivers go *through*, and if any loss occurs the responsibility can be fixed.

But the staging system has its advantages; the drivers working always along one section, work more cheerfully and endure less fatigue; the animals get used to the road. Grazing and water are more easily found for the wants of the small number of animals at each stage than for very large convoys. A larger quantity of provisions, &c., is carried by the staging system, as the men and animals in this case are not consumers of the food they carry. The animals get a comparative rest every other day. All repairs are more easily effected. Moreover the qualities of the various animals can be taken into consideration in appointing them to the stages, according as these lie over level or mountainous ground. When through two or more contiguous stages vehicles of nearly the same type are used, so that the mode of attaching the draught animals does not materially differ, the vehicles themselves may advantageously be sent through that part of the line, instead of being unloaded at each stage, the drivers with their animals and harness returning to their station with the empty vehicles; it is only on first starting such a plan that there will be any delay in their return.

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With the *meeting system* we obtain a more even distribution of work, and the drivers and animals return to their respective stations every night. The stages can be somewhat lengthened, as half the work performed is very light.

The arrangements for transferring the stores midway require only methodical treatment, the following points being particularly attended to:—

From each station one train should start daily in each direction under military escort, the escort varying with the nature of the stores (more men with treasure) and the degree of hostility of the inhabitants.

The hours of starting should be fixed at each station by the officer commanding, with reference to the length of stage, nature of road, and season of year, in consultation with officers commanding at adjacent stations. The hours and changes to be published in Station and in Line of Communication Orders.

It is plain that if the times are not strictly adhered to, and irregular hours are kept, the convoys and escorts will not meet halfway, and inconvenience and delay will be occasioned.

In tropical countries where rivers become suddenly swollen, and roads impassable, it is very desirable to have telegraphic or some other sure means of communication along the line, in order to prevent useless moves and detentions.

Means of Transport and its Organisation.

Means of transport.

The means of transport consists, according to the theatre of operations, of:—

(1) Carriers, male or female; (2) Pack animals; and (3) Wagons or carts.

Organisation.

Whichever of these means may be employed, a suitable organisation is necessary for the efficient working of the transport. It should be divided into easily managed fractions, so as to obtain perfect supervision.

Careful inspection of transport before taking the field.

Every carrier, animal, and carriage should be carefully inspected and passed as effective by the responsible officers before being allowed to take their place in the column of route. The officers should be held responsible if the animals are overladen or carelessly loaded; drivers of

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carts which break down through carelessness should be at once made prisoners, and handed over at the next station to the proper authorities for punishment.

Every carriage marked with the corps to which it belongs.

Every wagon, carriage, ambulance, &c., should be marked with the number of the Division, and of the corps, or branch of the service to which it belongs. In the South African Campaigns, where natives were largely employed, not only were wagons distinguished in this manner, but they also carried a small flag of different colours :—for ammunition, red; for commissariat, blue; for regiments, red, with the facing colour; artillery, blue and red; staff, red and white.

A waybill to accompany each convoy.

Before a convoy leaves the station of departure to move along the line of communications, the transport officer of the station of departure would give a waybill of the convoy and its contents to the "supercargo," or, if none, to the officer or non-commissioned officer of the escort. Such individual is then held responsible that the number of loads and animals received over at one station are duly handed over to the transport officer of the station of consignment.

Arrangement in the column of march.

The different animals, &c., should be arranged in the column in such wise that the slowest moving class heads the column and the fastest is in rear, viz., in the following order: carts, bullocks, camels, ponies, mules. Camels should not be fastened together in a continuous chain; but each camel-driver should lead his own special team with leading ropes of sufficient length to allow of free motion to all.

Space occupied on the March by Transport.—A pack horse, mule, or bullock in strings, with distance between every two animals, occupies 4 yards in column of route; a camel 6 yards. A carriage with 2 horses, mules, or bullocks, 12 yards; for each additional pair add 4 yards more.

1. *Carriers.*

Carrier transport.

In several of our wars and expeditions, notably in China, Abyssinia, Looshai, Ashantee, and Duffla, carriers have been largely used, either as the sole means of transport, or as supplementary to other. In India and other countries the entire carriage of the sick is performed by carriers.

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Its advantages.

This species of transport is advantageous in that there is no outlay before starting, and it can move over any ground accessible to man.

Mode of carrying loads.

Carriers have different ways of carrying loads :—on the head, as in Africa; on the back, as the hill coolies of India; on the back, with a strap round the forehead; suspended from a pole between the shoulders of two men, or at the two ends of a bamboo pole.

Average load.

The load will vary somewhat with the ground. In the China and Ashantee Wars and in Zululand the established load was 50 lbs.; in the Lushai and Duffla Expeditions the load was limited to 40 lbs. The regulation load for India is now 40 lbs.

Should be made regimental.

Carriers accompanying troops in the field may be permanently attached with advantage to regiments and corps. In the Lushai Expedition the same set of 5 coolies was attached to the same section (16 men) of infantry, and accompanied them on the march. On halting days they were employed as general transport.

Carriers on line of communications.

When working on the line of communications they should be organised in companies and squads, with headmen and superintendents, under officers. When men of several tribes are employed, it is desirable that men of the same tribe should work under their own chiefs. A staging or meeting system is the best for carriers on the line of communications, as, by returning to their homes every night, they do not carry unremunerative weight in the shape of blankets, &c.

Rate of march and distance.

Carriers can keep up perfectly well with marching troops for distances of 15 to 16 miles. On the line of communications, working by stages, they are capable, on good roads, of doing 12 miles with a load, and 12 miles back without one; on bad roads, 8 miles out and 8 home.

Organisation for South Africa.

The organisation recommended by the officer commanding the Zulu Carrier Corps* employed in South Africa, was as follows:—

Europeans—1 commandant,
1 Staff Officer, to act as quartermaster and paymaster,
1 interpreter,

* Major Salis-Schwabe, 16th Lancers.

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1 quartermaster sergeant,

1 captain, 1 subaltern, 1 interpreter, and 1 quartermaster sergeant to each station, or to 400 or 500 carriers,
1 non-commissioned officer to every 150 carriers.

Natives—1 native interpreter to every 150 carriers,
1 head Induna to each tribe,
1 Sub-Induna to every 40 or 50 carriers, each tribe to consist of not more than 100 to 200 men.

Hence, according to this proposal, for a corps of 1,000 men there would be required, irrespective of the Staff of the Commandant, a supervising Staff of 4 officers and 10 interpreters and non-commissioned officers—Europeans; and 32 interpreters and Indunas—natives.

Organisation for India.

The organisation of a Carrier Corps for Shillong and Rangoon proposed by Sir M. Kennedy, is as follows: the division of 1,000 coolies being taken as the unit:—

Europeans— 2 transport officers,
2 warrant officers (superintendents),
10 sergeants,
Natives— 10 havildars,
40 naiks,
1,000 coolies (being 1 non-commissioned officer to 16 coolies).

A medical officer should always be attached in order to check malingering.

2. *Pack Animals.*

Useful in difficult countries.

Pack animals are generally used in hilly and sandy countries, where the roads are bad or difficult; otherwise, wheel transport is preferable in every way. Pack animals are the most expensive description of transport, as, in comparison with wheeled carriages, more animals and attendants are required in proportion to the weight carried. On the other hand, they can follow troops everywhere, and can move alongside roads when the latter are required for other purposes.

Can follow troops anywhere.

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Too much attention cannot be paid to their feeding and care, to the proper fitting of the pack-saddle, and to the loading of pack animals. Above all things they should not be kept standing about loaded, waiting for the column to move off, longer than necessary; and whenever a halt of any duration (over a quarter of an hour) is ordered, the loads should be at once removed. It is not the actual march which tires the animals, but the time they are frequently required to remain under loads.

Pack animals should be fed before starting, and as soon after arrival at destination as possible. The men in charge should be carefully looked after, as, being themselves tired and ready to eat, they are prone to shirk their duty. Animals should be watered at least twice daily, and when they come to a good water supply on the line of march they should be allowed to drink freely, being halted for the purpose.

A good-fitting pack-saddle is of great moment, and the men of regiments, &c., should be carefully instructed beforehand in the loading of animals. It is a good plan for the packages on either side to meet at the top of the back before starting, as the gear stretches, while nothing should hang below the middle of the ribs.

Indian maund a good unit of weight.

It is very advantageous to have a package of about 80 lbs. (the Indian *maund*) as the standard unit of weight. Two such packages, together with the saddle, are a sufficient weight for a mule, "enabling him to go all day over heavy ground."* In view of this, all stores intended for mule transport should, before despatch to the base, be packed in bales, boxes, kegs, &c.,† of that weight, and then there will be no delay in starting the transport from the base of operations.

The following animals are those most commonly used for transport purposes:—Mules, horses and ponies, donkeys, camels, bullocks, and elephants.

(a) Mules, horses, and ponies:

(*a*) *Mules, Horses, and Ponies.*—Of all transport animals

* "Report of the Director of Transport, Indian Division, Egyptian Expeditionary Force."

† It is of the utmost importance that the cases, &c., should be unusually strong, to withstand the bad usage on service. Trade cases are useless. The address, contents, gross and net weight should be legibly marked on each package. Bales of hay should never exceed 100 lbs. weight.

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for pack purposes mules are the best. They are easier to load, are quicker on the march (keep up with cavalry), and can stand extremes of heat and cold and contend against privations better than any other animal. They are particular about their water, and require plenty of it. They are easily transported by sea or rail.

The Director of Transport, Indian Division, Egyptian Expeditionary Force, reported that "the mules from India improved during the voyage. On arrival, they were simply cast overboard, and swam ashore with the greatest ease and apparent enjoyment."

Next to the mule comes the horse, galloway (yaboo), and pony; but they are not so hardy, and are more liable to sore back.

Weight carried.

The weight for mules, horses, &c., is generally laid down at 200 lbs., including pack-saddle and gear, but if the animals become weak through insufficient food this weight must be reduced. In Abyssinia the weight, exclusive of saddle, was reduced to 100 lbs. A maund weight (80 lbs.) on each side, or 160 lbs. without saddle, is the now recognised weight for transport in India, and may be taken as a fair load over bad roads in a poor country, with steady continuous work.

Number of attendants.

One attendant to three animals is the usual allowance for mules, &c., for ordinary loads with troops, but, if taken under fire with ammunition and entrenching tools, at least one attendant to two animals is required.

(b) Bullocks.

(*b*) *Bullocks.*—Pack bullocks, although enduring, are too slow movers to accompany troops, but are useful on the line of communications. They will carry a net load of 160 lbs. at the rate of two miles an hour. They require abundance of forage and water, or soon fall into bad condition. In proportion to the food they require, they do not carry such remunerative loads as other pack animals.

Weight carried.

Number of attendants.

They are somewhat intractable and difficult to manage. They are readily transported by rail or sea. One attendant required to every three pack bullocks.

Weight in draught.

Bullocks, when used in draught, will draw on good roads a load of 800 lbs. at a rate of $1\frac{1}{2}$ miles per hour.

The organisation of a division of pack mules, horses, ponies, or bullocks, according to the new system in India, is shown in the following table:—

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Peace.	War.
250 Animals.	1,000 Animals.
5 Jemadars.	1 Transport Officer.
10 Duffadars.	2 Warrant Officers.
92 Drivers, *i.e.*, 1 to 3, and 10 per cent. spare.	20 Jemadars.
	40 Duffadars.
	366 Drivers, *i.e.*, 1 to 3, and 10 per cent. spare.
1 Weighman.	4 Weighmen.
1 Peon.	1 Gomashtah, 2nd class.
	4 Peons.

Exclusive of veterinary establishment and artificers—9 persons in peace, 39 in war.

(c) Donkeys: (c) *Donkeys.*—Donkeys are very hardy, eat little, and are useful animals for the carriage of loads not bulky (ammunition and warlike stores). The load should never exceed 100 lbs. without saddle. An attendant is required to every four or five donkeys.

Load.

(d) Camels: (d) *Camels.*—Camels are of two kinds—one-humped, the Arabian camel, largely domesticated in India; and the two-humped, found in colder climates. The camel of the plains is unsuited for the mountains, and owing to this circumstance not being taken into account the loss of camels during the last campaign in Afghanistan was very serious.

As transport moving with troops, and required to make long and rapid marches, camels are not suitable, although for bulky loads (camp equipage, &c.), exceeding in weight what a mule can carry, they are indispensable.

On the line of communications, working leisurely between depôts, in their own districts and under their owners, they are invaluable.

Load. The load may be stated at from 320 lbs. to 450 lbs., varying with their condition; if overweighted, their health speedily suffers. It is a good plan to provide them with a wooden label, showing the maximum weight the

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animal is to carry. The average regulation load is calculated at 400 lbs. With this load their pace averages from 2 to $2\frac{1}{2}$ miles per hour. Pace.

The chief defect of camels is their delicacy. They are awkward to load and unload; they become unserviceable in wet weather, are difficult to feed in some localities, and are not economically transported by rail. Their advantages are that they can go longer without water than the horse or mule, they require, generally speaking, no food to be carried, and are not harassed by extreme heat.

Camels require long rest, and, being slow feeders, plenty of time to graze. On halting days they should be sent out to graze at sunrise, and on these and all occasions they should not be brought back to camp from their grazing ground till the last moment.

One attendant can look after four camels carrying ordinary stores, but camels carrying sick should have an attendant each, and if carrying ammunition or intrenching tools one attendant to two camels. Number of attendants.

The organisation of a division of camels, according to the new Indian transport system, is as follows :—

Peace.	War.
100 Camels.	500 Camels.
2 Jemadars.	1 Transport Officer.
4 Duffadars.	1 Warrant Officer.
37 Surwans, *i.e.*, 1 to 3, and 10 per cent. spare.	1 Moonshee.
	2 Weighmen.
	10 Jemadars.
	20 Duffadars.
	184 Surwans, *i.e.*, 1 to 3, and 10 per cent. spare.
	1 Gomashtah.
	1 Naib Chowdry.

Exclusive of artificers—1 in peace and 5 in war.

(*e*) *Elephants.*—Elephants are useful under special circumstances of country and work, but are costly, difficult (*e*) Elephants:

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to feed in some localities, and are not easily transported by rail. Generally speaking, they are not suited to army transport.

Load and pace.

The females are preferable. With a maximum load of 1,200 lbs., the pace averages $3\frac{1}{2}$ miles per hour; the average load varies between 800 lbs. and 1,200 lbs. Elephants cannot go without water for more than 24 hours without injury; they drink 15 gallons at a time.

Attendants.

Each elephant requires a driver and a boy as attendants.

Wagons and Carts.

Wheel transport.

Wherever wheel carriage can be used, and there are few countries where it cannot, it is advantageous both as regards efficiency and economy, as an animal will draw three times the weight it can carry on its back.

Wagons and carts have been used in most of our expeditions.

In the war in New Zealand, 2-wheeled carts were used, with 1 horse in the shafts and a second horse leading.

In the Red River Expedition the ordinary Canadian wagon was employed. This wagon was worked over bad roads with 2 horses, and carried from 1,600 to 1,900 lbs.

In the American War of Secession, pack transport was gradually abandoned, and replaced by long wagons drawn by six horses or mules, driven by one man.

In the Abyssinian Expedition, in Afghanistan, and in Egypt, Maltese carts were used.

Essential qualities of a military transport carriage.

The essential qualities of a transport carriage are capacity and strength; stability over rough ground; lightness of draught and fair mobility; facility of repair and capacity of being taken to pieces and transported by rail or on board ship.

The maximum nett load that a transport horse should be required to draw in a campaign is 10 cwt.

Must be adapted to theatre of war.

The choice of a carriage is a very important matter. It is impossible, for obvious reasons, to have a universal pattern for our service. For instance, the general service wagon may do very well on the macadamised roads of western Europe, but was found ill-adapted to the indifferent roads of South Africa; it is unsuited for Afghanistan, Egypt, or the East generally.

South.

In South Africa the American buck-wagon was found

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most useful. It is a long, low, lightly but strongly built vehicle, with wheels far apart; commodious for loads, offering great facilities for loading and unloading; difficult to upset, and capable of travelling over any ground suitable to wheels. The general service wagon, on the other hand, was found to be unnecessarily massive and easily upset; it carried compact close-lying freight (ammunition, preserved meat, &c.) fairly well, but for bulky loads carried much less in proportion than the buck-wagon. African transport.

The "buck" wagon, with 18 oxen, and the "tented" wagon, with 16 oxen, up to 4,500 lbs. load, can travel 10 to 16 miles daily. The American mule wagons of South Africa have 10 mules, carry 2,200 lbs., and can march 20 to 25 miles if partly corn-fed.

Another useful carriage in South Africa is the Scotch cart, the only drawback being that some nicety is required in adjusting the load so as to preserve the balance of the pole upon the wheelers. With 4 mules a weight of 900 lbs. can be carried exclusive of the driver.

In the Afghan Campaign. many kinds of carts were used: Maltese carts, country carts, Heyland's cart, Phelps' handcarts, and a pony cart made up at Cabul by Colonel Low, carrying a weight of 640 lbs. Wheeled transport used in Afghanistan.

Maltese carts are excellent vehicles for general purposes, owing to their lightness, strength, ease of draught, and facility of repair.

The Heyland cart was favourably reported upon. Phelps' handcart or barrow on 2 wheels was used by the Commissariat both in Afghanistan and Egypt, but its tire was not found broad enough for trundling over sandy soil.

The experience of the Afghan Campaign has led the Government of India to introduce two natures of carts into the Service as permanent transport for use in Indian frontier expeditions wherever possible. One is called the "Army Transport Cart," drawn by 2 bullocks and capable of carrying 12 maunds (960 lbs.); and the other is known as the "Light Cart" drawn by a mule or pony, and carries 480 lbs. The latter is intended for regimental equipment, small arm ammunition, &c., while the former is designed to carry all kinds of bulkier loads, such as tents, &c. New transport carriage for Indian service.

In Egypt the Forage cart (with springs), and the

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Maltese (Carriage Department pattern) cart, were found well suited for transport purposes. Sir Edward Morris, Commissary General Egyptian Expedition, recommends that transport wagons or carts should not be of one uniform pattern, but should vary according to the requirements. Some should be light, others heavy; some with springs, others without; some with close sides, others with raves.

Peninsula organisation.

In the Peninsula the organisation of the transport was as follows:—

A *Park* of 800 carts, consisted of 2 *Grand Divisions* of 400 carts each.
Each *Grand Division* comprised 8 *Divisions* of 50 carts under an Officer.
Each *Division* consisted of 2 *Brigades*.
Each *Brigade* consisted of 25 carts, 50 bullocks, 4 spare, 1 conductor, 1 smith, 9 men, and 14 boys.

South African wagon train.

South African Wagon Train.—For the operations in Zululand in 1880, the mule wagon train accompanying the Field Force was organised as follows:—

It consisted of 21 sections of the following strength:—12 wagons, 126 mules, 1 Transport Officer, 1 Conductor (civilian), 34 drivers and foreloopers.

New Indian organisation.

The following is the organisation of a Division of Draught Transport, according to the new Indian Transport system:—

Army Transport Carts.

Peace.	War.
50 Carts.	250 carts.
100 Bullocks.	500 Bullocks.
2 Jemadars.	1 Transport Officer.
4 Duffadars.	2 Warrant Officers.
55 Drivers, 1 to each cart and 10 per cent. spare.	10 Jemadars.
	20 Duffadars.
	275 Drivers, *i.e.*, 1 to each and 10 per cent. spare.

Exclusive of veterinary establishment and artificers—8 persons in peace, 25 in war.

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Light Carts.

Peace.	War.
100 Carts.	600 Carts.
100 Animals. 2 Jemadars. 4 Duffadars. 110 Drivers, 1 each cart and 10 per cent. spare.	600 Animals. 1 Transport Officer. 2 Warrant Officers. 12 Jemadars. 24 Duffadars. 660 Drivers.

Exclusive of veterinary establishment and artificers—8 persons in peace, 21 in war.

Indian Transport.

The failure of the old system of "Movable Column Carriage," when put to the test in the last Afghan War, has led to an entire remodelling of the transport service :—

As now constituted the transport service is a branch of the Commissariat Department, the officers serving in it being under the orders of the Commissary-General. It is divided as follows :— New Indian system

(1.) Regimental transport.

(2.) Depôts of transport at certain centres.

(1.) *Regimental Transport.*—A force of some 46,000 men, of whom about 24,000 are stationed on frontiers, is to be equipped with one-half regimental transport on the Cabul or cold-weather scale of equipment.* Half the total number, or 23,000, could consequently be placed at once in the field within their respective districts fully equipped with transport on the cold weather service scale, *i.e.*, with native tents. Regimental transport.

The object of this arrangement is to extend the experience of the troops in the management of transport.

This carriage is in regimental charge. That of the

* *Vide* Table facing p. 220.

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Frontier Forces is to be Government property; camels, however, being hired, except for the Punjaub Frontier Force.

Transport depôts.

(2.) At the *Depôts of Transport* a nucleus of transport is to be maintained in peace, but arrangements are prepared for its expansion in time of war by registering the available animals in each district.

The depôts, under the management of transport officers, are organised in peace as skeleton cadres.

The transport of the depôts added to the carriage available from troops equipped with regimental transport (other than the Frontier troops) is sufficient to provide for the mobilisation on the hot-weather scale of the following troops within their respective areas :—

Punjaub	.. ..	10,000 men.
Bengal	.. ..	10,000 „
Bombay	.. ..	8,000 „
Madras	.. ..	5,000 „

The Europeans ($\frac{1}{3}$ of force) would be equipped on the hot-weather scale (*i.e.*, European privates' tents).

While the transport of the depôts, without touching the regimental transport at all and using only such transport as can be readily moved by rail, suffices to mobilise a force of 13,500 men at a distant point or seaport.

All transport, regimental and depôt, is under the direct orders of the military commanders of the district.

Advantages claimed for new system.

The leading points of the new system are :—

(*a*) That a large number of troops will become familiar with the management of transport.

(*b*) That the means will be available for at once augmenting the transport to war strength with personnel trained to transport work.

(*c*) That the system of depôts will admit of both the animals and followers being rapidly augmented to any needful extent.

Four of the transport depôts are to be also depôts of instruction and of training in transport work, for men detached from regiments for this purpose.

Nature of permanent transport.

The permanent transport is to consist of elephants, camels, mules, pack and draught bullocks, and carts, with a few boats and coolie carriers in exceptional localities.

Loads.

The average loads (or maundage) for the different animals, &c., are as follows :—

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Elephant	15 maunds	or	1,200 lbs.
Camel	5 „	„	400 „
Mule, pony, or pack bullock	2 „	„	160 „
Light cart	6 „	„	480 „
Army Transport Cart	12 „	„	960 „
Coolie	½ „	„	40 „

To put a European soldier in the field (Cabul scale) requires in round numbers (as may be seen by the tables facing p. 220) 1¼ maunds of transport, a native soldier ¾ maund. The proportion of natives to Europeans in a field force being usually about 2 to 1, it would be a liberal allowance to say that the equipment of a field force in India takes 1 maund per fighting man.

One maund per fighting man is the allowance per soldier for Indian campaigns.

The troops to be permanently equipped with one-half regimental transport, are:—

Troops to be provided with permanent regimental transport.

(*a*) A movable column and certain outposts in the Quetta District.
(*b*) Punjaub Frontier Force.
(*c*) Force on the Eastern Frontier.
(*d*) Force in Burmah.

The above are all forces guarding frontiers, and their transport is not to be considered available for mobilisation elsewhere.

(*e*) Force in the Peshawur District.
(*f*) Three mixed brigades in the Punjaub.
(*g*) A small force in Rohilcund.
(*h*) A mixed brigade in Sind.

These troops, or parts of them, would take part in any mobilisation of the troops in the Punjaub, Bengal, Madras, or Bombay. The collective strength is some 22,850 fighting men.

The following table shows the regimental transport to be maintained in time of peace:—

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Force.	Camels.	Mules.	Light Carts.	Elephants.	Sirdars.	Mates.	Coolies.	Maundage.
Quetta Column, &c....	...	1,496	...	...	...	...	...	...
Sind Brigade	222	183	50	...	...	...	...	1,625
Peshawur District	416	346	87	...	...	...	...	3,026
Three Punjaub Brigades	830	786	167	...	...	...	...	6,199
Rohilcund Force	161	93	29	...	...	...	...	1,072
Punjaub Frontier Force	360*	1,581	90	...	...	...	...	5,146
Eastern Frontier Force	...	240	...	46	18	36	924	1,584
Force in Burmah	...	1,076	...	106	...	...	...	3,626
Total	1,989	5,801	423	152	18	36	924	22,278

* Government camels.

Nature of transport at depots.

The depôts and their transport are shown below :—

Depôts.	Transport allotted. Elephants.	Camels.	Mules.	Pack Bullocks.	Carts, Army Transport.	Carts, Light.	Coolies.	Boats.	Maundage.
Punjaub—									
Rawal Pindi*	28	200	500	...	...	...	...	...	3,020
Lahore	30	100	...	...	50	...	...	...	1,550
Bengal—									
Meerut*	24	100	500	...	50	...	...	...	2,460
Sepree	28	150	...	...	50	...	...	...	1,770
Lucknow	96	...	...	...	50	...	...	...	2,040
Allahabad	31	...	...	250	100	...	...	...	2,165
Calcutta	54	...	...	...	50	...	...	...	1,410
Shillong	40	...	250	...	...	...	300	6	1,550
Bombay—									
Jacobabad ...		250	...	...	50	...	...	...	
Mhow	60	...	250	...	100	...	...	...	6,150
Poonah*		...	250	...	100	...	...	...	
Madras—									
Secunderabad ...		120	...	...	50	...	...	...	
Bangalore* ...	57	...	250	...	100	...	...	...	5,455
Madras		...	...	250	100	...	...	...	
Rangoon	...	...	...	500	...	50	...	...	1,300
Total	448	920	2,000	1,000	900	50	300	6	28,870

* Also training depôts.

The table facing p. 220, drawn up from Colonel Low's report, shows the proportion of camp equipage, weights, &c., for the different units, calculated upon the following establishments :—

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Regiment British Infantry.—Officers, 30; non-commissioned officers, 65; corporals and privates, 820; horses, 8; followers, 401.*

Regiment Native Infantry (8 companies).—Officers, 9; native officers, 16; non-commissioned officers, 80; drummers, 16; sepoys, 720; total 816; natives of all ranks, 832; horses, 10; followers, 229.

Regiment British Cavalry (6 troops).—Officers, 25; non-commissioned officers, 47; corporals, 24; privates, 384; chargers, 70; troop horses, 436; total, 506; followers, 720.

Regiment Native Cavalry (6 troops).—Officers, 9; native officers, 13; native non-commissioned officers, 60 (including 6 trumpeters); sowars, 477; horses, 550; followers, 469.

Horse Artillery Battery.—Officers, 6; staff-sergeants, &c., 20; gunners, 157; drivers, 54; collar-makers, &c., 7; horses, 175; followers, 364; artificers, 10.

Field Battery.—Officers, 5; staff-sergeants, &c., 20; gunners, 76; drivers, 54; trumpeters, collar-makers, &c., 7; horses, 110; followers, 272.

British Mountain Battery.—Officers, 5; staff-sergeants, &c., 22; gunners, 70; farriers, 2; drivers (native establishment), 170; yaboos, 5; mules, 178; followers, 199.

Native Mountain Battery.—Officers, 3; native officers, 2; non-commissioned officers, 10; trumpeters, 2; gunners, 60; drivers' establishment, 91; muleteers, 8; farriers, 1; mules, 111; yaboos, 4.

Company Sappers.—Officers, 2; European non-commissioned officers, 2; corporals, 4; native officers, 2; ranks, 114; horses, 4; followers, 61.

Entrenching tools per European Battalion.—586 lbs, viz., 2 felling axes per company, 16; pickaxes (15 per cent.), 135; shovels (15 per cent.), 135; billhooks (30 per cent.), 270. Carriage, 8 camels or 16 mules.

Tools for Native Battalion in same proportion, but fewer in aggregate. Carriage, 13 mules.

* Followers in this and the other establishments below, include servants, water-carriers, sweepers, doolie-bearers, sutlers, grass-cutters, grooms, and hospital establishment. Transport attendants are not included.

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The Afghan War, 1879–80.

Northern Afghanistan Field Force.

After the murder of the British Envoy, Sir L. Cavagnari, the resumption of hostilities in September, 1879, and the reoccupation of Kabul by Sir F. Roberts, the Khyber route became the only real line of communications. The Kuram Valley line, owing to the approach of winter, had been abandoned.

The direction of supplies and transport on the line of communications was entrusted to Major-General Sir Michael Kennedy, the transport being divided into two parts—one for work with the Kabul Field Force, the other for work on the line of communications.

Transport with field force.

The transport with the troops was regimental and brigade; on the line of communications, general.

Transport Staff for field force.

The Staff for the transport with the Kabul Field Force consisted of the following:—Chief Director of Transport (also in charge 1st Division), Staff Officer to Chief Director, Paymaster, Inspecting Veterinary Surgeon and Veterinary Surgeon; besides the following with the Divisions:—

1st Division.	2nd Division.
Chief Director in charge.	Director of Transport.
General Transport Officer.	General Transport Officer.
Assistant-General Transport Officer.	Assistant-General Transport Officer.
1st Brigade Transport Officer.	1st Brigade Transport Officer.
2nd Brigade Transport Officer.	2nd Brigade Transport Officer.
Cavalry and Artillery Transport Officer.	Cavalry and Artillery Transport Officer.

Transport Officers were in the proportion of 1 per 1,000 animals of the General Transport of the Division and Brigades.

The supreme control of the transport rested with the General Officers Commanding, under whose Orders the Chief Directors of Transport, generally at Head Quarters, had the direction of the entire transport of the force. Transport and equipment were obtained as needed by requisitions on the General Commanding the Line of Communications; the Chief Director, under the authority of the General Officer Commanding, being empowered also to purchase or contract locally.

Transport on line of communications.

On the Khyber Line of Communications the transport, for purposes of supervision, was divided into three sections—(1) Peshawur—Basawal; (2) Barikab—Fort Battye; (3) Safed Sang—Kabul. Each section had a Transport Officer to superintend it, located respectively at Lundi Kotal, Jellalabad, and Safed Sang. The whole distance was divided into fifteen stages, as follows:—

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First Section.	Second Section.	Third Section.
Jumrood.	Barikab.	Gundamuk.
Ali Musjid.	Rozabad.	Pezwan.
Lundi Khana.	Fort Battye.	Jagdalak.
Dakka.		Seh Baba.
Basawal.		Lattaband.
Lundi Kotal		Butkhak.

Transport Staff on line of communications.

The Staff for the transport on the line of communications consisted of:—Chief Director of Transport, Staff Officer to Chief Director, General Transport Officer, 2 Assistant General Transport Officers, 2 Paymasters, and 2 Veterinary Surgeons.

Of the Staff, the Chief Director, with his Staff Officer, resided at the Head Quarters of the General Commanding the Line of Communications. The General Transport Officer, 1 Asssistant Transport Officer, the Paymaster, and 1 Veterinary Surgeon, resided at the base (Peshawur); while at the other end of the line, the advanced depôt at Kabul, were located 1 Assistant Transport Officer, 1 Paymaster, and 1 Veterinary Surgeon. Of these, the Assistant General Transport Officer was the connecting link between the Kabul Field Force Transport and that of the Line of Communications, all convoys from the latter being consigned to him. General Transport Officers in charge of sections were to move constantly about the stations among which their sections were working: supervising, inspecting, and superintending payments.

Southern Afghanistan Field Force.

On the Sukkur-Dadur line, under General Phayre, the organisation was as follows:—

For each 100 *Carts*—100 drivers (1 per pair of bullocks), 1 Inspector 1st Class, 1 Inspector 2nd Class, 2 Head Muccadums, 4 Second Muccadums. For every 500 bullocks two Native Veterinaries (Salootris).

For Camels—1 Driver for every 4 camels, 1 Jemadar for every 50, 2 Veterinaries for every 500. For every 100 Camel Drivers—1 Inspector 1st Class, 1 Inspector 2nd Class, 3 Head Muccadums, 6 Second Muccadums.

For Mules or Ponies—1 Driver for every 3 ponies, and 1 Muccadum for every 50.

For Donkeys—1 Driver for every 6 donkeys, 1 Muccadum for every 50.

Zulu War, 1879.

The five columns which first invaded Zululand were accompanied by the following transport, chiefly hired:—14,283 oxen, 801 horses, 401 mules, 932 wagons, 65 carts, with 1,058 conductors, drivers, and foreloopers.

The plan, at first tried on economical grounds, of making or purchasing wagons to be fitted at Durban with teams of oxen, gear, &c., did not answer, as the owners objected to part with their oxen without selling their wagons, while the Kaffirs, turned out of kraals, as drivers and foreloopers, were inexperienced and ignorant of the management of wagons and oxen. Wagons and spans of oxen complete were then purchased, but in the end the system of hiring was found the most satisfactory.

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After the disaster of Isandlwanah, large reinforcements from home were added to the troops already in the field, and there ensued a great pressure for transport. The ox transport was reinforced by a large importation of mules from the Cape Colony and from North and South America.

By the beginning of July it was estimated that, besides the carriage of private contractors, moving stores and supplies to the frontier, about 400 horses, 3,000 mules, and 24,000 oxen were employed for army service.

The length of the line of communications from the base to the 2nd Division and Flying Column, at first 200 miles, and latterly 300 miles, with a force of 7,000 men to be supplied from the base, added considerably to the difficulties of transport. The absence of proper roads and the system of transport by heavy wagons in vogue in the country, necessitated the employment of large teams of animals.

Of the different kinds of transport, opinion seems to have been in favour of the ox transport, especially for steady work along the lines of communication, as oxen are easily procurable, feed on the pasture of the country, are capable of drawing heavy loads at a uniform pace along bad roads, and require fewer followers to look after them. But in the winter season, when the pasture fails and corn and forage have in any case to be carried, mule transport is preferable.

Of the mules obtained from Cape Colony, South America, North America, and France, the Colonial and South American were found the best.

The wagons and carts used in the transport were of four principal descriptions—the English-built general service wagon, the South African, the North American large and small buck wagon, and the Scotch cart. The first, though well-calculated for transport on good metalled roads, was found ill-adapted for the rough travelling of the Veldt.

Sir Evelyn Wood recommended that the transport should consist of ¾ ox wagons of the country and ¼ American wagons with mules. The ox wagons to have 18 oxen for "buck," 16 oxen for "tented" wagons. The American wagons to have 10 mules. Loads to 4,500 lbs. for ox wagons, 2,200 for mule wagons. Length of march for ox wagons, 10 to 16 miles. For mule wagons 20 to 25 miles if partly corn-fed, 15 miles if not corn-fed.

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Native Cavalry.			n Battery.	Company Sappers.	
y.	Mules.	Quantity.	Quantity.	Mules.	Quantity.
	No.	lb.	lb.	No.	lb.
	...	150	150	...	150
	...	640	160	...	80
	Regimentally arranged‡		80	...	80
	Ditto		40	...	40
	7 L. P.	...	...	1 L. P. and 3 S. P.	...
	14			12	
	Regimentally arranged		...	2 L. P.	...
	...	150		4	
	2 L. P.	...	...	1½ S. P.	...
	4		...	4½	
	...	324	...	...	...
	...	...	...	1 L. P.	...
				2	
			...	1 L. P.	...
				2	
			...	...	...
	...	120			
	...	640			
	Regimentally		120	...	120
	Regimentally		160	...	80
			80	...	80
	Regimentally		40	...	40
	...	4,690	5,550	...	3,990
	...	8,250			
	..	...	1,210	...	510
6	...	90	135	...	60
	...	960	...	...	...
	...		30	...	20
	...	800	320	...	210
6 mules or 3 camels		...			
4	3	...	400	...	400
2	...	...	...	2	...
	...	80	...	...	...
	...	162	...	...	...
	2	...	...	...	...
	2	...	...	...	...
	...	...	...	...	...
	3	...	...	...	...
	...	360	...	...	...
	...	...	...	1	...
	...	...	120	...	80
6 m	1	...	...	...	...
	...	...	...	...	...
	...	...	...	...	...
	...	...	...	...	...
	...	...	690	...	...
	35	17,716			
	109	or	,285	30½	5,940
	144 mules.		or	37¼	or
				68 mules.	

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CHAPTER VII.—TRANSPORT OF TROOPS BY SEA.

Introduction.

Expeditionary force by sea.

In consequence of our insular position, nearly every war in which the British army is engaged has to be preceded by the transport of the expeditionary force by sea to the seat of war.

The starting point of the expedition may be the British Isles, a Colonial or Indian port, or all conjointly.

Number of steamers required so great that few nations capable of undertaking the operation.

For the transport of a large force, a considerable amount of shipping is required. A Division on the war establishment, packed closely for a voyage of a few hours, requires for its transport no less than 17, while an Army Corps of three Divisons with the corps details requires 74, large steamers. For a voyage to a distant colony a Division requires 30, and an Army Corps 135 large steamers.

If we examine the navy lists of foreign Powers and the returns of large mercantile steamers present in their ports, it will be found, even under the most favourable conditions, that, with the exception of Great Britain and perhaps France, no nation has at any given moment sufficient tonnage at disposal for the transport across the seas of 50,000 men. Fortunately for them, their circumstances do not require it.

The Powers of Continental Europe are pretty well agreed that, in a war in which they are engaged among themselves, the success of a "landing" is so problematic in these days of rapid telegraphic communication, that the operation is hardly worth the risk. But they are, at the same time, agreed that a landing upon the shores of a militarily weak and badly organised State is a perfectly feasible and advantageous operation.* For instance, in a war between Russia and Germany, where the forces are

* It must not be forgotten that, in the eyes of Continental Powers, we come under the designation of a militarily weak State; and that against a combination of the Powers, or against one strong Naval Power, our immunity from invasion is by no means secure.

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nearly equally balanced and the preparations for defence matured, neither of these Powers would care to risk the success of a force embarked for a descent on the other's coast; while in a war between Russia and Turkey, where the forces are unequally balanced and the means of defence in one case at any rate ill organised, an unexpected landing at some well-chosen and important point—say one from which the defences of the Bosphorus could be taken in rear—would promise very decided results.*

Hence the military writers of Continental Powers, who have no colonies beyond the seas to defend, dismiss the subject of *Landings* or *Descents* in a few words.

Turning to Great Britain, the case is different. It is a condition of our existence as a nation that we be able to send troops to the support of our distant colonies or to the shores of a neighbouring State with whom we may be in alliance or at war. Such obligations may entail the despatch of a force varying from 3,000 to 60,000 men.

Transport by sea requires study in time of peace.

For the transport of a force of any size considerable preparation is required even by Great Britain.

A certain number of troopships, Imperial and Indian, are maintained in time of peace for the annual reliefs.† Besides these, we can in some cases despatch line and marine battalions in ships of war, as was done for the Egyptian Expedition in 1882. But this assistance cannot always be counted upon, as, if our foe be a great Naval Power, those ships of war will be required for the defence of our own coasts, for convoy, or for blockade purposes.

The supplementary tonnage has, therefore, to be obtained by chartering vessels of the Mercantile Marine, of which there is usually an ample supply in our ports.

It would not do, however, to defer the selection of suitable transports to the eve of the outbreak of hostilities; consequently, in time of peace a department

* The creation of a Black Sea Fleet, of a Cruiser Fleet, and the development of the Russian Mercantile Marine in those waters will, in the course of a few years, make this operation a feasible one.

† The Government troopships are as follows:—The Indian troopships "Crocodile," "Euphrates," "Jumna," "Malabar," and "Serapis," each capable of conveying 1,097 men and 58 horses. The Imperial troopships "Himalaya" and "Orontes," also 1,097 men and 58 horses each; the "Tamar," 1,097 men and 10 horses; and the "Assistance," 800 men and 8 horses, or 160 men and 138 horses.

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of the Admiralty—the Transport Department—is charged with keeping a register of all the steamers of our Mercantile Marine which are suitable for transport purposes, and with making arrangements for rendering those at home immediately available in time of war.

Selection of Vessels for Transport Purposes.

Large steamers the best.

In respect to the selection of vessels for transport purposes, it may be said generally that steamers form the best class of transport, and that the largest and roomiest are both advantageous and economical.

Steamers have the advantage that they are faster than sailing ships, and are independent of wind and weather. Hence they not only complete the voyage more quickly, and in these days of the telegraph the gain of time is of great importance in all operations, but they are less liable to capture by the enemy's cruisers.

The larger the steamers the better, as they have proportionately greater carrying capacity, afford increased comfort, while the hygienic conditions are more favorable and the units less broken up. It must be borne in mind that during the enforced rest on board, especially when prolonged, both men and horses lose condition, and their efficiency and fighting power diminish. Fast and large vessels minimise this drawback: fast, because they reduce the number of days on board; large and roomy, since they diminish the motion, and allow of men and horses being exercised.

Sailing ships sometimes used.

Sailing ships may be used when the enemy is not likely to be encountered on the high sea, or in fair weather, and for short voyages; but they should be towed by steamers. In the transport fleet conveying the Indian troops to Malta, the sailing vessels were towed by those under steam.

Authorities for Transport.

Office of Director of Transport Services.

The permanent office of the "Director of Transport Services," at the Admiralty, has now replaced the temporary Boards which, in former campaigns, were constituted for the emergency and were dissolved at the close of hostilities.

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To this department of the Admiralty at home, or to its representative abroad, the military authorities address all requisitions for the conveyance by sea of troops and stores. The representative abroad of the Admiralty is the Senior Naval Officer of the station, or, if there be no Naval Officer, the local Senior Commissariat Officer.

If transport has to be taken up for an expeditionary force, the arrangements devolve upon the "Director of Transports" at home or upon his agents abroad. For the despatch of the Indian troops to Malta in 1878, the Superintendent of Marine, Bombay, hired the necessary transports under instructions from home.

Arrangements for an expeditionary force made by Admiralty and War Office.

The mode in which the transport is arranged for an expeditionary force is as follows:—

The tonnage required for the various units with their regimental transport on the war establishment, and for all military stores, &c., has been already worked out in time of peace by the Admiralty in consultation with the War Office. This tonnage varies with the nature of the service, the length of the voyage, climate to which proceeding, and probability of the troops being detained on board in a warm climate. For instance, a lower scale would suffice for a short military operation, involving only a few hours sea-passage, than would be requisite for a voyage to a distant colony. Consequently tables for three contingencies have been prepared: (1) for a short voyage of a few hours' duration; (2) for a voyage not exceeding a week; and (3) for a voyage to any part of the world. See Table next page.

Tonnage varies with the conditions.

The "Director of Transport," in consultation with the Quartermaster-General, then determines the tonnage required for the expeditionary force which it is proposed to despatch.

The calculations of the carrying power of vessels is made as follows:—

Freight carrying power, how estimated.

Ships are registered as of so many tons gross, the number representing the tons corresponding to the total cubic space below deck, and of the closed spaces above deck. To arrive at its freight-carrying capacity, we must deduct all the non-freight-earning spaces: crew-room, engine-room, coal spaces, &c. For these a large deduction—40 per cent.—has to be made in practice. So that a ship of 3,000 tons gross has only a freight-carrying power of some 1,800 tons.

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Tonnage required for Units.

Unit.	Short Voyage.			Voyage under 7 days.			Distant Voyage.		
	Net.	Gross.	No. of Ships.	Net.	Gross.	No. of Ships.	Net.	Gross.	No. of Ships.
Infantry Battalion (1096 m., 58 h., 12 car.)	1,800	3,000	1	2,500	4,500	2	3,000	5,300	2
Cavalry Regiment (653 m., 618 h., 10 car.)	2,500	4,400	2	5,000	8,800	4	6,000	10,500	5
R.H.A. Battery (181 m., 183 h., 16 car.)	720	1,250	1	1,500	2,650	2	1,800	3,150	2
Co. R.E., with Field Park, (236 m., 95 h., 15 car.)	650	1,150	1	1,050	1,850	1	1,300	2,200	1
Pontoon Troop (339 m., 248 h., 31 car.)	1,300	2,250	1	2,450	4,200	2	3,000	5,250	2
Telegraph Troop (315 m., 201 h., 24 car.)	1,100	1,950	1	2,000	3,900	2	2,400	4,250	2
Division	21,000	35,000	17	33,000	55,000	27	40,000	68,000	32
Army Corps	87,000	147,000	74	147,000	250,000	110	176,000	300,000	135

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In the same way, when calculating the gross register tonnage required for a given body of troops, about 66 per cent. must be added to their estimated net tonnage.

Estimated tonnage under three conditions.

The tonnage to be allowed for man and horse varies in the main with the length of the voyage. Thus it is estimated that (1) for a short voyage of a few hours, a man requires an allowance of $1\frac{1}{3}$ tons, a horse $2\frac{1}{3}$ tons; (2) for a voyage under a week, 2 tons per man, 6 per horse; and (3) for a voyage to any part of the world, $2\frac{1}{2}$ tons per man, 7 tons per horse.* In these calculations are included arms, ammunition, stores, 1st Line transport complete, together with provisions and forage for one month in the second case, and for three months in the third case, but not tents or other 2nd Line transport. When a large amount of transport vehicles accompanies, additional tonnage must be added.

Man and horse.

For 2nd Line transport, extra stores, hospital ships, and food beyond the aforesaid provision, other vessels will be required.

Wagons and carts.

The tonnage for most of the wagons and carts used in the service is given on the Table opposite. (See also Regulations for the Supply of Stores to an Army in the Field. November, 1881.)

As regards hospital ships, see Lectures on "Medical Department;" and as regards store depôt ships, see Lecture on "Commissariat and Transport Department."†

The first operation when shipping has to be hired is to call for tenders unless the service is emergent, when this arrangement will have been anticipated (see *ante*, p. 214).‡ These tenders may be for (1) transports, (2) troop freight ships, or (3) store freight ships.

Classification of hired vessels.

A *transport* is a ship wholly engaged for the Government service on monthly hire; or a ship wholly engaged by Government to execute a special troop service, though not hired by the month.§

A *troop freight ship* is a vessel not wholly engaged by

* A mule same as a horse. A camel with driver, half as much again as a horse.

† Lectures on "Administration" in Staff College course.

‡ Forms of tenders for each class are given in the Transport Regulations.

§ For expeditions they are usually hired for so many months certain at so much per ton *per mensem*, with power to the Admiralty to retain by the month after expiry of original hiring.

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[*To face p.* 226.

ny Corps.

Tonnage. Packed for Shipment.	Weight.		
	Empty.		Filled
tons.	cwt. qr. lb.		cwt. qr. lb.
4·112	24 0 19		30 0 0
3·818	23 0 26		29 0 0
1·600	6 0 13		...
2·468	8 2 0		20 0 0
2·443	12 0 17		31 0 0
2·112	11 2 3		...
5·325	7 1 25		17 1
10·711	42 2 21		...
3·625	17 3 6		...
4·438	25 2 6		42 0 0
4·438	25 2 18		40 3 0
8·604	27 0 0		...
4·516	23 3 8		30 1 0
4·615	25 1 19		...
4·800	27 2 20		37 0 0
5·820	29 3 16		45 3 0
3·500	17 1 0		...
5·000	17 0 24		...
4·659	19 2 26		†
4·828	17 3 22		30 cwt. to 41½ cwt. according to stores.
4·169	18 3 12		
4·177	23 1 0		...
3·777	17 1 0		...
4·408	21 0 14		...
11·962	24 2 0		...
11·962	23 1 0		...
11·962	24 1 0		...
8·292	18 3 0		...
11·962	25 3 0		...
7·502	16 1 8		...
7·502	16 1 8		..
5·820	25 0 4		42 1 14
6·777	21 1 5		...
13·990	21 2 5		...

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Government, but performing a voyage with or without a mercantile cargo or passengers.

A *store freight ship* is a vessel wholly or partially loaded with Government freight.

After the tenders have been sent in to the Admiralty the vessels are inspected, either by a selected Admiralty officer or a Board, consisting of an officer of the Quartermaster General's Department, an officer of the Navy, and a Dockyard official, according to the rules laid down in the Transport Regulations. The main points to be attended to in the selection of a suitable vessel are seaworthiness, comfortable accommodation, freedom from smells and vermin.

Charter party.

The vessel having been passed as suitable, a charter party or agreement is entered into between the Admiralty and the owners. Forms of charter party are given in the Appendix to the "Transport Regulations."

In all charter parties the hirers accept the "Regulations for H.M.'s Transport Service" as binding upon them, and it is specifically stated that these regulations are "taken to be incorporated and form part of the charter."

Fitment of vessels.

The vessel is now ready to be taken to the port of fitment if she is not already there.

Vessels intended for the transport of the men and horses of an expeditionary force must be fitted according to the service they have to perform. Full instructions as to the fitment of ships for the reception of troops and horses and as hospital ships are given in the "Transport Regulations." For ordinary stores and supplies no special preparations are needed, the articles being shipped as cargo; but for ammunition and combustible stores special precautions are necessary.

Usually done under Government supervision.

At home the fitments are, as a rule, completed under Government supervision, the work being generally performed by contract; but in the colonies, if possible, they should always be carried out by Government. Sir Frederick Roberts, writing after the Abyssinian Expedition, strongly recommends, "that all transports hired in India should be fitted up by Government; when left to the owners and agents to do, they think of nothing else but of making as much money as possible. It is a matter of indifference to them whether animals are lost or injured during the voyage, and the most careful supervision will not prevent

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their putting up the stalls as cheaply and as badly as possible. The workmen they employ, chiefly Chinamen, would readily take service under Government, and, by having all the transports moored together in the vicinity of the dockyard, the work of supervision would not be difficult."

This recommendation appears to have had its effect, for in 1878 the preparation of the transports for the Expedition to Malta was carried out by the principal departments in Bombay:—the Public Works Department, Dockyard, Port Trust, Municipality, &c.

Staff Officer approves of fitment and the military arrangements generally.

Although then the actual hiring of vessels, when performed by a military department at all, devolves upon the Commissariat, while their fitment is done by or under the supervision of the naval authorities, the Staff Officers of the Quartermaster General's Department are concerned in the approval of proper vessels, and in seeing that the fittings are suitable for the service required, and that proper accommodation is provided for the men and horses.

Close personal relations between the representatives of the Admiralty and of the Quartermaster General are therefore necessary.

The details of the fitment of transports, as already stated, are given in the "Transport Regulations" and in Lord Wolseley's Pocket-book. It may be convenient, however, to give a brief summary here of the more important points to be remembered. They are as follows:—

Summary of points to be noted in the fitment of transports.

Ventilation and arrangements for cleanliness are most important in all transports.

When men and horses are carried together in the same ship, the accommodation for the men should be away from the horses, and by preference *under* rather than over them. Their being on the same deck is objectionable, but when unavoidable, no doors or openings should exist through the bulkheads.

For men the minimum height from deck to beam is 6 feet.

Hospital in convenient part of ship, fitted with standing bed-places and with dispensary adjacent. Bedding to be in proportion of 5 per cent., and cots (in addition to bed places) 2 per cent. of troops embarked.

Latrines in proportion of 3 per cent., and lead-lined urinals as many as may be required.

When 50 persons embarked, a bakery and ovens suffi-

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cient to provide fresh bread four times a week. When 50 men, or 30 horses or mules, embarked, a distilling apparatus to be provided, capable of distilling during 24 hours one-fourth more water than the full allowance for all on board.*

Each deck to be separately ventilated. Decks cut through when deemed necessary and cowls fitted.

Prison to be provided, divisible by movable bulkheads into separate cells.

Transports to be furnished with at least two accommodation ladders.

Requisite space for swinging hammocks. Hammocks are 9′ long, but, except the outside ends of the first and last rows, only occupy 6′ of deck length. They are slung from hooks, 16″ apart in the case of men, 20″ in the case of sergeants.

Mess tables are usually supported by iron slings from the deck above and are removable. Accoutrement and valise battens are usually arranged so that each man's property is stowed between the beams where his hammock slings. Sea-bags are hung on hooks at side of ship or placed in racks. Arms also in racks.

Vessels for horses not lower than 7′ between decks, or 12′ in hold, and of a beam not less than 30 feet. Hatchways not smaller than 10′ square.

Horses' heads face inwards. Passage of 6 to 10 feet between mangers, and 2 or 3 feet between haunch rail and ship's side, so as to get at ports and scuttles and to clean.

Sizes of Stalls:—*Horses*, 6′ × 2′ 2″. Extra-sized stalls, 6′ 6″ × 2′ 4″ for 5 per cent. Spare stalls for 10 per cent., distributed on each side to enable horses to be shifted for cleaning the stalls. Loose box (3 stalls) for all ships; two boxes if 150 horses embarked. *Mules*, 5′ 6″ × 1′ 8″. *Draught bullocks* same as horses. *Pack animals* in pens, 3 together, each having 5′ × 1′ 8″. *Elephants*, 14′ × 6′, in the hold tail to tail, one fore and both hind legs tethered.

Arrangements made for slinging all horses in horse hammocks, raised by means of blocks and tackle, care being taken not to lift a horse off his legs.

As a rule, horses are carried on the main deck for Horses usually

* Minimum allowance for all purposes—6 pints per man out of tropics, 1 gallon in tropics. Horse or mule 8 gallons, ponies and bullocks 5 to 6 gallons, elephants 40 gallons.

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carried on main deck.

long voyages, but stalls are sometimes erected on the upper decks of large vessels, roofed like sheds, and with curtains front and rear as protection against weather. But the arrangement is undesirable, as the deck load increases the rolling, and in heavy weather the horses and stalls are liable to be washed away. The "Queen" proceeding to Natal in 1881 lost 12 horses in this way before reaching St. Vincent.

Troop ships conveying infantry usually take the few officers' horses on deck, either in stalls or in horse boxes.

Inspection after fitment.

After the vessel is fitted and ready for troop service, she is surveyed by a Board consisting of a Staff Officer of the Quartermaster General's Department, another officer not below the rank of captain, and one or more naval officers.* The senior medical officer at the station is to attend for the purpose of giving his opinion on sanitary points, and the medical officer who is to proceed in charge of the troops is also to be present. When horses are embarked a veterinary surgeon also attends.

This inspection usually takes place at the port to which the ship first proceeds for the embarkation of troops.

The vessel being found ready and suitable for the reception of troops, the latter are brought down to the place of embarkation.

Demurrage claims.

Staff Officers concerned in the embarkation or disembarkation of troops in or from vessels chartered for a specific voyage must be on their guard against any detention of the vessel beyond the number of days specified in the charter party.

A certain number of days are specified therein for embarkation and disembarkation, and if this number be exceeded, demurrage can be claimed. The rate of demurrage is 10 shillings per register ton for sailing vessels, and 20 shillings for steamers per month of detention. So that for a large steamer of 3,000 tons, the claim for demurrage would be at the rate of £100 per day.

Duties of Staff Officers superintending embarkation.

The embarkation is always carried out under the supervision of the General Officer, through one of his Staff. The functions of the latter are to look after the interests of the military authorities and of the troops, to superintend the general arrangements connected with

* *Vide* "Queen's Regulations, 1883," Section XVII, p. 27.

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the embarkation of the men, guns, horses, and so forth, to ascertain that all the preparations are complete, and to communicate orders to the officer commanding the troops. The Staff Officer does not interfere unnecessarily with the actual getting the troops, &c., on board, when once the desired arrangements have been pointed out to the commanding officer, but his duties lie rather in concerting with the naval authorities the necessary measures for embarkation according to the circumstances. Thus, if the position of the vessel is alongside a wharf, the amount of space available for drawing up the troops, and the approaches to the vessel, have to be considered; if the vessel is off shore, the means available for conveying the troops from shore to ship, the means for getting into the boats, &c., have to be arranged so that there may be no hitch or confusion.

Troops inspected before embarkation.

Troops under orders to embark are minutely inspected by the officer commanding at their station, and a medical examination is at the same time made. A second medical examination takes place on the day the troops quit the station for embarkation, or, if that is not possible, on the previous day; and no individual showing signs of contagious or infectious disease, is to be allowed to proceed.

Instructions as to equipment to be embarked come from Adjutant-General, movements from Quarter-master-General.

The instructions which are requisite as to the preparation and equipment of the troops to be embarked emanate from the Adjutant-General's Department, while all arrangements for their movement and embarkation with their baggage and stores are made by the Quarter-master-General's Department.

In ordinary peace service these are very simple in their character, but in time of war vary with circumstances.

With reference to the quantity of baggage embarked with the troops for service, general officers commanding are required to take measures that no excess over the authorised proportions is permitted. The regulated quantity only is to be sent to the port of embarkation, and placed under the charge of an officer, who will be responsible to the Staff Officer superintending the embarkation that no baggage in excess of this quantity is put on board.

As regards baggage of troops proceeding as reliefs, see Queen's Regulations, Section XVII, p. 34, *et seq.*

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Classification of equipment and stores embarked.

Equipment and stores shipped in vessels in which troops are embarked may be classified as under, viz :—

(1) Equipment, including regimental baggage.

(2) Stores, shipped in charge of the master of the vessel, consigned to the Senior Ordnance Store Officer, but stowed specially as "first for landing," so as to be accessible and landed first.

(3) Stores, shipped in charge of the master, consigned to the Senior Ordnance Store Officer at the base of operations for general reserve.

Disposition of 2nd Line camp equipment.

Tents, horse-blankets, surcingles, pads, forage nets, and waterproof sheets, being *2nd Line* * camp equipment, will *not*, except under special circumstances, be issued to the troops prior to embarkation. Such stores will not be demanded by corps, but will be shipped by the Ordnance Store Department, according to the orders received from Head Quarters. When ordered to be shipped they will not be given in charge of the troops as equipment (as it is of great importance that the troops should not be encumbered with the charge of stores which they may not eventually require, and be unable to convey with them), but arrangements will be made by the Ordnance Store Officer to stow them in that part of the ship destined for the reception of equipment and baggage, so that they may be readily accessible, if required by the troops on disembarkation. They are marked "First for Landing," and are consigned to the Senior Ordnance Store Officer at the port of disembarkation, but a list is given to the officer commanding the troops on board, whose duty it is to ascertain where they are stowed.

On landing it will be for the general officer commanding to decide whether the wagons containing the tents, horse blankets, &c., carried in *2nd Line* transport, shall be attached to regiments and corps, or whether those articles of equipment shall follow the troops later on. In the latter case the tents, horse blankets, &c., will remain in charge of the Ordnance Store Department until required by the troops, and then will be forwarded by that department to the *advanced depôt*, or other point directed by the general officer commanding, through the department charged with the transport on the line of communications.

* *First Line* comprises arms, accoutrements, blankets, picketing gear and tools, which in all cases are in regimental charge.

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Too much attention cannot be paid to the arrangement of stores on board transports; it must be remembered that at the point of disembarkation labour may be scarce, and that all work may have to be done by the soldiers and sailors themselves. The whereabouts of everything must therefore be known, and every article likely to be required in the early part of the operations must be near at hand. Careful arrangement of stores on board necessary

The embarkation of the men presents no difficulty, and as a rule occupies little time, but that of the horses requires some preparation. Let us first consider the case of embarkation from alongside a wharf. Embarkation of men and horses.

In the case of the "Assistance," horses are walked on board and thence by a ramp to the lower deck, and in the case of infantry transports where the horses are carried on the upper deck, they can be led over a gangboard; but usually they require to be slung on board by means of tackle attached to the yard-arm. The horses are either lifted in a horse-box or by means of a sling passed under their bellies.

The rate of slinging varies from 20 to 40 horses from each set of tackle in the hour, according to the expertness of the men.

When the transport lies off shore, horses are taken alongside in lighters. They are arranged in the lighters heads and tails athwartship, in order to economise space. Each horse has his rider at his head.

The time taken to embark troops varies very much. If the vessel is lying in docks or off a pier the embarkation is much more rapid than when she is lying off shore. The state of the weather has its influence if the embarkation has to be made in an open roadstead.

The chief points to be attended to when the ship is off shore are to have as many accommodation ladders for men and as much lifting gear for horses as possible, consistent with the available working room,* and to keep up a continuous stream of troops and horses to the ship's side.

In the case of the "Dublin Castle" embarking the 3rd Battalion 60th Rifles—700 strong—for the Cape in 1879,

* In the case of the "Serapis," "Jumna," &c., four steamers can lie alongside and discharge simultaneously. With the smaller troopships only 2 steamers can lie alongside.

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the vessel lay in mid-stream off Gravesend. The troops arrived alongside in small steamers, each carrying 250 men, and coming from the Gravesend and Tilbury sides of the river. In 1½ hour all the men were on board.* The heavy baggage and stores had been previously embarked.

In the case of a transport alongside a wharf, the following may be taken as average times:—The 91st Regiment embarked in the "Pretoria," at Southampton Docks, by means of two gangways in less than an hour. All heavy baggage had been previously stowed.

A company of the Commissariat and Transport Corps —240 men, 235 horses, &c., and 14 wagons—embarked in the "Queen Margaret," at Victoria Docks, in 6 hours. Horses were slung on board.

The King's Dragoon Guards, 320 men and 292 horses, embarked in the "Spain" in less than 5 hours. Part of the horses were slung on board, part entered by gangboard.

The heavy baggage of a battalion takes 3 to 4 hours to stow if two gangboards are used; 5 to 6 hours if only one is used.

A battery takes 5 hours to stow when alongside a wharf; half a cavalry regiment about the same time. A general service wagon, when in charge of troops who know their work, takes 15 minutes to unload, strip, and take to pieces.

Second inspection board.

When the troops are on board and the baggage stowed, a second or final inspection† is held to ascertain that the intended arrangements as to berthing and stowage have been carried out, and that the ship is ready for sea.

When troops are embarked at more than one point, the final inspection takes place at the last port of embarkation. Sometimes it is made while the vessel is under way.‡

The Board for final inspection is to consist of one or more naval officers, 1 staff or field officer, and a captain not proceeding with the troops. A medical officer not proceeding with the troops will express his opinion as to the

* 15 minutes to receive the men, 5 minutes to reach the ship, and 20 to 25 minutes to discharge.

† Queen's Regulations, S. XVII, p. 30.

‡ In 1879 the final survey of the "Dublin Castle" was made while she was going down the Thames.

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medical arrangements. The officer commanding the troops accompanies the Board in its inspection.

Embarkation Returns (Army Form B. 143), are prepared beforehand in duplicate by the officer commanding the regiment or corps, and as soon as the troops are on board, are verified by the staff officer conducting the embarkation. One copy is retained by him, and the other is returned to the officer commanding (Queen's Regulations XVII, p. 6). Embarkation Returns.

In the case of drafts, the return is compiled by the staff officer superintending the embarkation from returns rendered to him by the respective commanders of drafts. The officer in command of the troops is then furnished with a copy.

All necessary forms required on the voyage are to be furnished, if required, by the staff officer superintending the embarkation.

Disembarkation at a Port where no Opposition is Expected.

On arrival at the port of disembarkation of transports conveying troops, they are at once boarded by the Naval Boarding Officer and the Staff Officer of the Quartermaster General's Department, through whom the several instructions of the naval and military authorities are communicated. Procedure on arrival at port.

At Durban, during the Transvaal Operations of 1881, the following regulations obtained for transports disembarking troops in the roadstead:— Transvaal Operations, 1881.

The Military Landing Officer—an officer of the Quartermaster General's Department—on boarding, gave instructions to the officer commanding as to the disposal of the troops on landing, and then returned to the shore to receive the troops, horses, and baggage at the wharf.

The Naval Boarding Officer remained on board to conduct the disembarkation, and at its completion forwarded his report to the Principal Naval Transport Officer, who communicated it to the Commandant at the base.

For landing from transports anchored in the roadstead, lighters were used. The first steam tug embarked from the transport a fatigue party of non-commissioned officers and men, including cooks, with a proportion of officers

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(including the Quartermaster), the tents of the regiment, and the cooking utensils. On arrival at the wharf, part of the fatigue party proceeded with the tents to the camping ground, while the rest remained at the wharf ready to unload the lighters as they arrived. The rest of the regiment then landed in lighters towed by tugs. In embarking on the lighter the men's kits were first stowed, and after this was done the men went on board; each man carrying his arms, but nothing else. After the men were all on shore, the baggage of the regiment was landed, the heavy baggage being at once taken to the baggage store at the base and given over to the custody of the Baggage Master.

Naval Descents

General observations.

The transport of large bodies of troops by sea to a theatre of war has been frequently practised with success from the remotest periods of history. Since the invention of gunpowder and the improvements in artillery these enterprises have, however, become less frequent; and in the present day, when the telegraph and the railway have augmented the power of concentration, it is generally accepted that for a successful descent the invader must be not only a strong maritime Power, but the invaded a Power militarily weak and badly organised.

The reason is obvious. States which respect their independence make a profound study of their system of defence, and upon the results of this study base their plans of mobilisation. The telegraph covers the country with its web, and the railways are laid out to facilitate concentration at important strategical points. When war threatens all important points of the coast are watched, and in some cases garrisoned. In these circumstances a descent on the coast might, under very favourable conditions of landing place, weather, and surprise, have a temporary success, but the forces landed even in one or two days are comparatively so small that they should, with proper arrangements, be a mere mouthful for the forces of the invaded Power. The most that can be attempted is a landing, followed by a raid and the destruction of some important point, and succeeded by a hasty retreat before tion of each unit having been decided in reference to its

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the enemy recovers from his surprise. Now suppose the troops gathered in force, batteries thrown up, the landing place torpedoed, or the weather bad, and a descent becomes hazardous, if not impossible.

That the invader must be a stronger maritime Power, goes without saying; otherwise he would be beaten at sea before he could arrive.

The question might be asked, How, then, did the comparatively weak French and British forces gain, and afterwards maintain, a footing in the Crimea against the resources of Russia?

The successful foothold of the allied armies upon the Crimea was due to the security and freedom from attack of their communications, and, on the other hand, to the badness of the Russian communications with the interior of the Empire. The same operation could not be attempted again in the altered circumstances of Russia.

With these preliminary observations let us now consider the procedure in the case of the embarkation of an expeditionary force and its disembarkation on a hostile shore, the enemy being supposed to be a weaker naval Power than ourselves. This case will include all minor operations of the same class.

Numerous ports of embarkation desirable.

Embarkation.—In large operations it is desirable to have as many ports of embarkation as practicable—ports where there are accumulations of ships of the Mercantile Marine. The embarking places, whether wharves, stages, or the open beach, should be previously divided off, and the approaches thereto so arranged that the respective embarkations may not interfere with one another.

Each transport to carry a complete unit.

In assigning the troops to the different transports it is an admitted principle that, if possible, each transport should carry a complete unit with its regimental transport and baggage, or if this cannot be done, that, at any rate, the portion of the unit carried should be complete with baggage, ammunition, equipment, stores, and regimental transport, so that it may be ready to land and act without reference to the remainder of the regiment or battery.

Stores properly arranged.

It is a general principle also, that those things which are required first on landing should be embarked the last.

Movement of troops to ports.

The transport or transports for each unit having been determined by the Quartermaster-General, in conjunction with the Director of Transport, and the port of embarka-

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place of mobilisation, the orders for the movement (by rail or road) to the port of embarkation must be carefully drawn up, the numbers of the transports and all the details as to baggage, equipment, ammunition, &c., made known to the troops. Each transport would have its number, and also the unit it conveys, clearly painted on its hull.

Transports to be numbered.

Staff at port of embarkation.

At each port of embarkation there would be a Staff Officer of the Quartermaster-General's Department and a naval officer representing the Transport Department of the Admiralty acting in conjunction, the naval officer having full powers over the shipping, and the staff officer over the troops. A sufficient executive staff under these officers should be present in order to control and carry out the service expeditiously and safely.

Rendezvous of transports.

When the transports have received their freight on board they would proceed to the general rendezvous of the transport flotilla, under convoy of men-of-war, should the enemy's cruisers be reported near our coasts.

Escort squadron.

On arrival at the general rendezvous, each transport would have assigned to it a definite position, according to the troops it has on board. Here it would be taken under the command of the naval officer commanding the Escort Squadron, who forms the transports into divisions or lines, and issues the sailing orders. The same relative position assigned to each transport is maintained during sailing and while at anchor.

Grouping of transports into divisions.

In the case of an Army Corps, the flotilla would be probably divided into four divisions—one division for each Division of the Army Corps, and one division for the Corps details.

For the movement to the Crimea the transports were distributed in 5 divisions, corresponding to the 5 Divisions comprising the Expeditionary Force. Each division had a distinguishing flag, and when they moved from their rendezvous they sailed by successive divisions.

Strength of escort squadron.

The escort squadron of men-of-war would naturally vary with the strength and quality of the enemy's fleet and the chances of a collision, and must therefore be determined according to the probable work before it. But, as a general rule, it would not be less than one vessel for each division of the flotilla, and one for the Commodore, with a certain number of despatch vessels and steam launches.

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If a force is to co-operate from India, the same general principles would apply. The Bengal troops might conveniently embark at Calcutta and Kurrachee, the Madras troops at Madras and Beypore, the Bombay troops at Bombay and Kurrachee. Indian ports of embarkation.

The men are halted at convenient stations on the lines of rail, and there supplied with service clothing, their kits weighed, and so forth. "Sickness and disease are always more or less rife in the Presidency towns, and nothing is gained by having the men in them longer than necessary."*

Disembarkation.—The disembarkation of a force on a hostile shore requires very careful arrangements.

One of the chief points to be attended to is the provision of suitable boats and flats for landing men and horses, and material for the construction of piers. Each ship should be amply provided therewith, and also with a steam pinnace. The delay in the landing of the Persian Expedition in 1856 was due to the number of boats carried in the transports being insufficient, especially for the horses and artillery. Reliance was placed on finding Arab boats on the spot, but they were not forthcoming. Hence 9,500 men and 1,500 animals occupied 3 days and 2 nights for their disembarkation. Sufficiency of boats important.

Napoleon's preparations for the invasion of the United Kingdom in 1804 were most complete in respect of providing suitable boats for the mounted branches.

It must be remembered that when once a firm *pied à terre* has been established, cavalry is a most important arm of the service, being required for gaining intelligence of the enemy's movements, striking terror among the local population, destroying railways and telegraphs, making requisitions, preventing the assembly of troops, and veiling the position and weakness of the landed force. Cavalry must be accompanied by horse artillery, and be prepared to act with great boldness, and to sacrifice itself if a retreat of the landed force becomes absolutely unavoidable. Importance of an early landing of cavalry.

The ordinary boats of our Imperial and Indian troopships and of large first-class mercantile steamers are spacious and numerous enough for landing the men, but Troopship boats.

* Sir F. Roberts.

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for the horses and guns additional boats, specially adapted for the purpose, are required.

A special boat has been designed. It is suited for landing cavalry and guns in shallow water, being of light draught, without a keel of the ordinary kind, stable, capacious, and easily stowed on board ship. It is 35½ feet long by 10½ feet beam, and carries 10 horses or 2 guns. The stern consists of a flap, hinged in such manner that it lowers bodily, forming a convenient gangway from the boat to the shore; when shut up, the boat is watertight. Each transport carries 1, 2, or 3 of these special boats according to its capacity.

Each Division should have at least 40 of such boats and 20 to each cavalry brigade; for an Army Corps at least 180 are required.

Ordinary ships' boats can approach the shore to within a depth of 3 feet, when the men must jump out and wade to land.

If the required number of horse-boats is not available for landing the guns, rafts, made by connecting two long-boats with transverse beams and overlaying with planks, or constructed with pontoons or casks, may be used, as was done for landing artillery in the Crimea.

Admiral Sir William Mends, the late Director of Transports at the Admiralty, who planned and superintended the arrangements for disembarking in the Crimea, recommends that when the disembarkation is likely to be contested, no more than 40 men should be put in any boat at one time—a greater number makes the boat more difficult to manage, and increases the risk if it is struck by artillery fire.

He further recommends that these boats should be towed, when practicable, either by steam-launches or men-of-war boats.

Rendezvous near point of disembarkation.

Before attempting a landing on the enemy's coast, it is generally desirable to select a place of rendezvous for the fleet, not more than a few days' steam from the point of descent, where the force can be finally organised, and the reserves of men and horses landed in order to get into condition.

Selection of place of disembarkation.

The selection of the actual place of disembarkation on the enemy's coast will depend on strategical and topographical considerations, and on the preparations of the enemy to

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prevent it. As most States with a sea-board have considered the various points at which the enemy might land, and have made corresponding plans for his discomfiture, it will generally be found necessary to make threatened descents at several points of the coast, in order to draw off the enemy's attention from the real spot where the descent is contemplated.

Should the selected point prove to be occupied by the enemy in force, and to be protected by heavy artillery behind strong works, and especially if the wind or weather is against landing at that particular point, the question will arise whether, in lieu of fighting the batteries with the ships' guns, it will not be desirable to resort to some other place of disembarkation, the power of steam in the present day enabling us to transfer our flotilla at pleasure. It is obvious that, although the superiority of our artillery fire might eventually destroy the works and dislodge the enemy, the delay in the landing will have given him time to concentrate his rearward troops at the threatened point.

Hence it is desirable to have several alternative places of descent in view; in fact, the vagaries of wind and weather alone necessitate this.

There is no question that the invention of torpedoes, covered by guns, has enhanced the power of the defence, as in time of war all important bays, mouths of rivers, &c., would be protected by these and other obstructions, active and passive; and even, if the circumstance of their being placed rests only on rumour, the mere possibility of their presence exercises a great moral and deterrent effect.

Requirements of a good spot for disembarkation.

But putting the question of torpedoes aside, the points to be looked after in selecting a place for landing are as follows:—

(1) Good practicable beach of sufficient length for a considerable body of troops to land at one time.

(2) Good anchorage for vessels near the shore, so that the ships' guns may effectively support the descent with their fire.

(3) Ground near landing-place should not afford shelter to the enemy against the fire of the ships' artillery.

(4) The nature of the roads in the vicinity of the coast, the water supply, and the possibility of obtaining supplies and transport should be favourable.

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(5) Ground near landing-place should not impede the subsequent advance of the troops when landed. Marshes, inlets of the sea, are unfavourable, as the roads across them become defiles.

A promontory where the fleet can flank the landing on both sides is very favourable.

A deep bay well sheltered from the prevailing winds, with plenty of good anchorage room, and a gradually shelving beach, is also favourable.

Rocky and steep coasts or those with a large expanse of flat sand, are unsuited.

Calculation of beach necessary for landing.

With regard to the extent of beach required for a given force, this will depend upon the number of boats available and the size of the force. The more rapidly the fighting troops can be thrown on shore, the better.

Let us make the calculation of beach required for a Division, and then we shall have the data at hand for any force.

The detail of shipping for a Division would be as follows:—

Infantry, 7 *Battalions*.—7 Transports (each 3,000 tons gross). Each ship 10 boats, capable of landing 400 men, and 3 horse boats capable of landing 30 horses.—Total boats, 91.

Cavalry, 1 *Regiment*.—2 Transports (each 2,500 tons) ½ regiment in each; 10 boats capable of landing 400 men, and 3 horse boats to each.—Total boats, 26.

Artillery, 3 *Batteries*.—3 Transports (each 1,250 tons). Each ship 8 boats for the men, and 1 horse boat for 10 horses or 2 guns.—Total boats, 27.

Engineers, 1 Company, and Military Police, 1 troop.—1 Transport (1,200 tons). 8 boats for men, and 1 horse-boat for 10 horses.—Total boats, 9.

Infantry and Artillery Reserve Ammunition Column.—1 Transport (2,500 tons). 10 boats for 400 men. 3 horse-boats for 30 horses or 6 wagons.—Total boats, 13.

Medical Department.—2 Transports (each 1,500 tons). 8 boats for men, and 2 horse boats to each.—Total boats, 20.

Staff, Veterinary, Chaplain, and Commissariat.—1 Transport (1,250 tons). 8 boats, 1 horse boat.—Total boats, 9.

Total 17 Transports (37,700 gross tonnage) with 195 boats.

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These 195 boats moving from the ships to the shore in line, at a distance apart of 50 feet from centre to centre, would occupy an extent of front of 3,250 yards—under 2 miles.

The whole Division could not be landed at once, but the bulk of the force could be carried in two trips.

From the above data the length of beach required for any given force can be calculated.

Transports will anchor in several lines.

It does not follow that the 17 transports will be anchored in one line. If large there will not be sufficient room for them; for a transport of 400 feet length requires 480 yards to swing in. So that in the beach length of a Division only 7 transports of the Division could be accommodated. The 7 transports carrying the infantry, being required the first, might therefore be placed in first line;* the seven carrying cavalry, artillery, engineers, and reserve ammunition column in the second, and the three remaining in third line.

Procedure of fighting ships.

Whilst the transports are taking up their anchorage, the smaller ironclads and monitors would, if necessary, engage the shore batteries and clear the landing place of the enemy. They should stand in-shore for the purpose. The larger men-of-war cannot approach nearer than the 8-fathom line; corvettes, the 4-fathom line. Transports draw about 20 feet of water.

Arrangements for landing.

The orders for the operation of landing are usually issued to the commanders of the troops some time before they are to be put in execution, though not necessarily made known throughout the army. Those for the landing in the Crimea, which took place on the 14th September, were issued on the 31st August, so that, as the 2nd paragraph of the order itself sets forth, they may be "attentively considered and thoroughly understood by the officers who are responsible for their execution."

The instructions issued by the Senior Staff Officer of the Army should contain the hours the several corps are to leave the ships, in what order and by what means &c.; the clothing to be worn, the number of rations to be carried, the ammunition, whether and when the regimental transport is to be landed and so forth. The General

* The Cavalry Brigade Transports would be brought into front line ready to land when a *pied à terre* has been established.

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Officer Commanding and the Naval Commander-in-Chief would be in consultation as to the employment of the boats, and the way in which the disembarkation is to be supported by the guns of the fleet. A large "beach party" of seamen should also be landed under a naval officer to assist in the disembarkation.

In arranging for the first dash on shore, the units, such as battalions, cavalry regiments, and batteries, should be stripped of all men, horses, and carriages not considered absolutely necessary for carrying out the operation. What should be landed at first should be all that is absolutely necessary for the efficient working of the force during the first few hours.

As a rule part of the infantry and artillery would be the first to land, and the cavalry when a firm footing on shore is obtained.

There is no difficulty about disembarking and landing *men*, but horses and carriages are less easily landed, and still more difficult to re-embark in the event of a repulse.

The anchoring of the transports in lines in the order in which the troops are to disembark, the distances of these lines apart, and the movements of the boats, are all naval matters, and should not be interfered with by staff officers, who should only assist.

Aber-crombie's Expedition to Egypt, 1801.

The instructions for landing in Egypt in 1801 were as follows:—

Boats to be at least 50 feet apart, and to take distance and dressing from the right, centre, or left as ordered; to be arranged in three lines. The number of boats employed was 150, each carrying 50 men exclusive of the crew.

In the actual landing the first signal was given from the flagship at 2 A.M., for the boats to repair to their respective ships. At 3.30 A.M. the boats full of men proceeded to their rendezvous—viz., 3 armed vessels in line out of fire from the shore—where the boats were to form and await orders to proceed to land.

At 9 A.M. the signal was given, and the boats conveying a Division of some 5,500 men and 10 guns, but no horses, pushed forward at full speed on a front of about a mile. The field guns were so carried in the launches that they were on shore and in action as soon as the infantry. The smaller armed vessels stood nearer in-shore to cover the landing, and opened fire on the shore batteries.

The French allowed the boats to approach within easy range, and then opened fire on them. Several boats were sunk. The landing was, however, successful, and the French were driven from their position.

Crimean Expedition, 1854

In the arrangements for landing the British Army in the Crimea the Divisions anchored in the order in which they were to stand on shore. The boats, rafts, &c., were allotted to vessels in proportion to

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the number and description of the troops they carried. The distance of the transports from the shore varied from 600 to 1,400 yards. At 9 A.M. on 14th September, 1854, the signal was made from the flag-ship for the boats to assemble round the ships to disembark infantry and artillery. At the second signal they formed in line at regular intervals apart, and at the third started for the shore. The infantry were chiefly in the ships' launches, towed by the pinnaces and smaller boats. By 3 P.M. 14,200 men and 2 batteries of artillery were landed, but the disembarkation was continued long after sunset; the cavalry and engineers landed during the two following days, their transports being brought closer in shore. In all 326 boats and 24 horse-flats were used.

Historical Record of Naval Expeditions.

Within the last century there have been the following instances of expeditions, some of which have resulted in successful descents:—

In 1796, General Hoche sails for Ireland with a force of some 18,000 men and 43 vessels, but the fleet is dispersed by a storm.

In 1798, Napoleon lands with an army of 35,000 men near Alexandria and occupies Cairo.

In 1799, an Anglo-Russian Expedition of upwards of 30,000 men lands in Holland. The English contingent of 17,000 men was carried in 130 transports, with an escort of 15 ships of the line and 45 frigates and brigs, but the disembarkation was delayed for 6 days by a gale, so that the advantage of a surprise was lost.

In 1801, Sir Ralph Abercrombie, with some 16,000 men, proceeded to the Bay of Aboukir, but owing to strong gales and a heavy swell was prevented landing for 6 days, so that the French had full time to prepare. The disembarkation was effected in presence of the enemy's batteries. Operation successful, and chiefly due to the constant practice of the sailors in embarking and disembarking during their detention in Marmorice Bay.

In 1804, Napoleon projected an invasion of England and Ireland on a large scale. 150,000 men with 10,000 horses were collected at Boulogne and at the Helder. The flotilla for the transport of this force consisted of:—1,200 to 1,300 flat-bottomed boats of light draught, capable of propulsion by oars or sail, for the men, guns, and 20 days' provisions; and 900 or 1,000 boats for the horses, war material, &c. The men were constantly practised in the operations of rapid embarking and disembarking. The plan failed, owing to the inability of the escort squadron to reach the rendezvous.

In 1830, the French make a successful descent on Algiers with 37,000 men.

In 1854, the English contingent of the Expeditionary Force to the Crimea, consisting of 33,500 men and 3,350 horses, was conveyed in 93 steamers and sailing vessels to the Crimea, under escort of 25 war vessels and 9 others. The French contingent of 28,000 men and 1,430 horses was conveyed in 128 ships. Landing successful.

In 1856, a British Division, consisting of 5,670 European and native troops and 3,750 followers, 1,150 horses and 430 bullocks, was de-

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spatched to Persia in 45 vessels. The troops were embarked at Bombay, Vingorla, Porebunder, and Kurrachee, and landed at Halileh Bay without serious opposition. Disembarkation delayed by insufficiency of boats.

In 1860, the British contingent of the Anglo-French Expedition to China, consisting of some 14,000 fighting men, was carried in a fleet of about 200 vessels.

In 1862, the army of the Potomac under MacClellan, 80,000 men, was safely conveyed from Alexandria on the Potomac to Fort Munroe on the James River.

In 1867, the British Force detailed for the campaign in Abyssinia, consisting of some 11,000 fighting men and 12,000 followers, was conveyed in 75 steamers, 205 sailing vessels and 11 tugs.

In 1878 an Indian contingent, consisting of 6,122 fighting men, 2,500 followers, and 1,750 animals was carried to Malta in 12 steamers and 15 sailing vessels. The Bengal and Bombay troops embarked from Bombay, the Madras troops from Beypore.

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CHAPTER VIII.—TRANSPORT OF TROOPS BY RAIL.*

Railway first employed for transport of troops in 1831.

In the year 1831,† when this country was perturbed by rumour of invasion, a tentative experiment was made for the purpose of ascertaining the practicability of concentrating a force by rail to oppose the landing of a hostile army on our shores. A regiment was transported from Liverpool to Manchester, a distance of 34 miles, in two hours, whereas in marching it would have occupied two days. This is the first recorded instance of the employment of railways in aid of an assumed operation of war.

When this occurrence was mentioned in the French Chamber of Deputies, General Lamarque ‡ added in a prophetic manner that "Steam in all probability would produce a revolution in the conduct of war no less marked than the invention of gunpowder."

The prophecy has been fulfilled in its completest sense. Not only has war gained immensely in energy and rapidity, but the large armies of the present day are so dependent upon the iron road as a means of supply, that their operations are determined by the direction of the railways.

First employed for war purposes in 1848.

The first employment of railways in time of war occurred during the insurrection in Hungary in 1848–9, when a Russian Division was moved from Cracow to Gradish, a distance of 185 miles, in five days. Since that date they have been used in all campaigns in all parts of the world, wherever the local conditions are favourable.

Changes in war brought

With respect to the changes which the employment of

* The Official Regulations bearing on the transport of troops by rail are contained in the "Regulations for the Organisation of the Line of Communications of an Army in the Field," issued with Army Circular 1st June, 1878, and the "Queen's Regulations" Sec. XVI, Paragraphs 33–87.

† Six years after the construction of the first railway, from Stockton to Darlington, in 1825; the first railway in Germany, Nürnberg to Fürth, was opened in 1835; the first in Russia, Petersburgh to Tsarskoe Selo, in 1836.

‡ Well known as the Pacificator of La Vendée, and as Commandant of Paris at the time of Napoleon's return from Elba.

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about by railways:

railways for military purposes has induced, the first which strikes us forcibly is the rapid way in which they enable troops to be mobilised and conveyed to the frontier.

(1) Time of strategical concentration reduced.

(1) Formerly, while weeks and months passed before armies could commence operations, the time for the concentration of the largest armies is now measured by days. For instance, in 1815, the fatal blow had been struck at Waterloo by the British and Prussian troops before their allies, the Austrians and Russians, could reach the Rhine; while in 1870 the German armies crossed the French frontier within three weeks of the order of mobilisation, and before a month had elapsed from the opening of hostilities, the Imperial Army of France had been defeated in seven battles, and the Emperor himself consigned to captivity.

The gain in time in the strategical concentration of troops, especially when the distances are long, is very considerable. Troops in large bodies cannot be expected to march more than 12 or 15 miles on an average per day, while in 24 hours a railway train can accomplish a distance estimated abroad at about 420 miles, in England at 720 miles.* Not only is there this gain of time, but the men arrive very little out of condition, and not reduced by the casualties which inevitably occur during a long march. In fact, on the day of their detrainment troops are capable of doing a fair march and of participating in a battle.

Example (1). In 1849, during the Hungarian insurrection, the Russian Division under General Paniutin, consisting of 13,000 men, 2,000 horses, and 48 guns, with 464 carriages, was transported in 31 trains from Cracow to Gradish, a distance of 185 miles, in 5 days, including a night's rest. The same Division would have probably taken 15 days or more to accomplish the distance, while in that time its effective would have been reduced by 3 to 5 per cent.

Example (2). In 1859 the 1st Austrian Corps (Clam Gallas), consisting of 37,500 men, 10,728 horses, 1,128 carriages, and 96 guns, was conveyed from Prague, through Dresden, Hof, and Munich, to Italy. The entraining commenced on the 22nd May, and in 10 days a Division of some 10,000 men reached Milan and took part in the Battle of Magenta. The Brenner was passed on foot, and occupied 3 days. For the ordinary marching route through Budweis, Linz, Salz-

* This difference is due to the circumstance that on the Continent the practice is to run long trains at a low speed, while in England short trains with a high speed are preferred.

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burg, and Insbrück to Verona, 650 miles, some 60 days would have been taken.

Example (3). In the same campaign the French troops in Paris, 75,000 men and 4,500 horses, were transported from the capital to Marseilles in 10 days (thence by sea to Genoa), whilst they would have taken 50 to 60 days to march the distance. For this campaign some 200,000 men were conveyed from various parts of France by rail to Lombardy.

There seems to have been little order in the arrangements. Riflemen were carried in the same trains with artillery material, while the gunners did not follow till days after. Regiments had to leave the terminal stations without their transport, and remained for days without their most pressing requirements.

Example (4). In 1866 the Prussian Guard Corps was transported from Potsdam to Brieg, 265 miles, in 10 days. For marching 26 days would have been required, nearly three times as long.

Example (5). In 1870 the Prussian Army Corps of the Eastern Provinces reached the Rhine 9 days after the commencement of the transport, having accomplished from 330 to 400 miles. The movement was therefore four or five times as quick as by ordinary marching.

Example (6). In a concentration of British troops at Lahore for operations on the North-West Frontier, it is calculated that 40,000 troops could be brought from Delhi to Lahore in 10 days; and 30,000 from Mooltan to Lahore in the same time, complete with guns, horses, and stores. This concentration by ordinary marching would occupy from 3 weeks to a month.

Advantages of rapid concentration.

Rapidity of concentration on the frontier means nowadays that the State which has best laid out its railways for strategical purposes, and which has thoroughly incorporated them with its scheme of mobilisation and strategical concentration, will be in a position by its earlier appearance on the frontier to lay down the law to the adversary.

Railways leading to frontiers should be laid out strategically.

The misfortunes of France in 1870 were in a great measure due not to the want of railways, but to their being ill-calculated to serve a concentration on her north-east frontier, and to the omission of that careful study of the railway network by which alone the resources of a State can be turned to the fullest account for purposes of war, whether offensive or defensive.

A well-arranged plan of mobilisation, a railway network which offers numerous independent lines leading to the frontiers, and a well-distributed use of the railway power, are just as important for the defence and security of a State as the size and good quality of the army.

The events of 1870–71 have not been lost, in respect of teaching, upon ourselves in England, although much

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Railway system should be incorporated in defence.

remains to be done. The growth of foreign navies, the rapidity with which armies can be mobilised and transported to the coast, the increase to the mercantile marine of foreign nations, have all tended to deprive the "silver streak" of its proverbial security to our shores. The result has been that for the last 10 years our Head Quarter Staff has been engaged in examining all our harbours and landing places, and considering them with reference to possible invasion. Defensive positions have been selected wherein to assemble our forces on the first sign of landing, while the facilities of the railway network for the movement of the troops have been worked into the general scheme. To this we shall revert presently.

(2) Supply facilitated.

(2) Railways facilitate the forward flow of supplies to, and the return current of sick, wounded, prisoners, and trophies from, the army.

The large armies brought into the field in the present day by Continental Powers cannot do without railways for the forwarding of supplies. Had there been no railway available, the supply of the German forces before Paris would have been impossible. The operations of General Bourbaki's army in January, 1871, were completely tied to the railway, which was his sole means of existence.

Removal of prisoners.

The 300,000 prisoners of war which fell into German hands would have necessitated for their escort by march route the withdrawal from the field army of a large body of German troops for a month or even longer; but the employment of railways admitted of these escorts being reduced to small bodies, which were available again for fighting after the lapse of a fortnight.

Power of railway in supply.

A railway goods train on a level consists of some 35 ten-ton wagons, carrying 350 tons or 10,000 maunds, and assuming a low estimate (such as on Indian railways), can easily run 200 miles per day. Its daily carrying power is therefore 70,000 ton-miles or 2,000,000 maund-miles, or equivalent to that of 40,000 camels,* or 100,000 pack-animals, or 10,000 general service six-horse wagons.

Example (1). In Egypt, 1882, between 28th August and 25th September, 88 trains were despatched from Ismailia, conveying 1,308 truck loads, or some 9,000 tons of material and stores.

* A camel carries 5 maunds, and moves at the rate of 10 miles a day. Its daily carrying capacity is therefore equal to 50 maund-miles.

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Example (2). During the Afghan Campaign and up to 29th February, 1880, the gross military traffic booked under Government Warrants on the Sind, Punjaub, and Delhi Railway alone, included 304,130 troops and followers, 82,140 horses, &c., 414 guns, artillery and engineer carriages, 4,897 carts, 2,223 camels, 86,560 tons of commissariat, ordnance, and other stores; 23,327 tons of railway material.

The above weight of commissariat stores does not represent all the stores carried; as much was sent up by private firms.

Troops are in some cases booked twice over, as they were halted at Mooltan and other places for weeks, and then entrained again. Still the entrainments constituted distinct operations.

In all 1,318 military trains were despatched in addition to the ordinary traffic.

(3) Railways enable separated armies to be reinforced at will, by the transport of troops from one theatre of war to the other, within a short period of time. This is particularly advantageous for the defender acting in his own territory, but is a possible operation as well for the invader. (3) Transfer of troops from one theatre to another.

The bringing up of reinforcements from distant parts is more easy than movements immediately in rear of the front of troops, as in the latter case the enemy may place himself within striking distance and interrupt the operation.

Many instances might be cited from the Franco-German War of the employment in this way of railways by both sides.

In August, 1870, General Vinoy's Division was transported by rail from Paris to Mézières, in order to reinforce the army of Marshal MacMahon.

During the campaign on the Loire, 28,000 infantry belonging to the 15th French Corps were transported from Salbris (in the Sologne), viâ Vierzon and Tours, to Mer (near Blois) and Vendôme, between 7 A.M. on the 27th and 9.20 P.M. on the 28th October, without the movements being observed by the Germans. By 8 A.M. on the next morning they were followed by 16 batteries, 2 cavalry regiments, ammunition columns, &c.

In November, 1870, 40,000 men of all arms, under General Crouzat, were forwarded in 88 trains from Besançon on the Doubs to Gien on the Loire in 3 days, and the movement was not known to the Germans until completed.

These movements were well managed by the French, but the attempt at the end of December to transport General Bourbaki's army with especial speed from the Upper Loire to the Doubs Valley failed, owing to defects in the necessary preparations and want of good management. Two Corps and the army reserve, consisting of a Division, took 7 days to entrain, and altogether 10 days for the journey, which it was hoped would have been completed in half that time.

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Although the assailant cannot count upon large movements of troops by rail in the enemy's country during the operations, he can restore and use the lines within the occupied districts in rear. In these cases every precaution must be taken against the action of partisan detachments, and the rate of transport will probably be much slower.

In 1870–71 the German troops used the occupied railways for the movement of their troops in France and for the reinforcement of their several detached armies. The 14th Division, which at the end of 1870 was besieging the fortresses on the northern frontier of France, was transported from thence to Châtillon-sur-Seine by rail between the 7th and 14th January. On the latter date the whole of the combatants of the Division were assembled at this town. They were then followed by the ammunition columns and trains.

While the German forces were besieging Paris, they kept trains in constant readiness for conveying troops to reinforce their detached armies.

The 1st German Army in its operations against the French Army of the North had to show front towards the north and east at Amiens, and also towards the west at Rouen. They utilised the line of railway (70 miles) joining these two cities to assemble the bulk of the troops at either end of it at pleasure.

An earlier instance of this use of railways may be cited from 1866. The victorious Austrian Army of the South was transported by rail from Italy to Vienna for the purpose of covering the capital and of serving as reinforcement to the beaten army of the North.

(4) Expedite retreat.

(4) Railways may be used to expedite the retreat of a beaten army, and enable a scattered army to concentrate for a new effort.

Example. The 1st French Corps which had suffered defeat at Wörth made use of the railway from Lunéville to Chalons-sur-Marne in order to elude pursuit.

(5) Tactical purposes.

(5) The employment of railways for tactical purposes on the battle-field is limited to special cases. Ordinarily the time occupied in entraining and detraining, the danger of interruption to which the railway is exposed in the immediate neighbourhood of the enemy, the circumstance that railways within the area of tactical operations are usually destroyed, all these militate against their employment on the battle-field. Still, in certain circumstances, great use may be derived from them, as in the defence of a river line, coast line, or range of mountains, in rear of which the railway runs, and where facilities are offered for

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concentration at any threatened point; or in the defence of a fortress, where a circular railway exists, as in the case of Paris. Opportunities sometimes also offer for the employment for tactical purposes of an armoured train carrying heavy artillery and troops for offensive purposes, as in Egypt in 1882.

Example (1). On 6th August, 1870, four German battalions were brought up by rail from Neunkirchen and St. Wendel to Spicheren, and played an important part in the battle.

Example (2). To reinforce the Army of the North for the impending battle of St. Quentin, 19th January, 1871, orders were given by the German Head Quarters for the 16th Brigade with a battery to be sent by rail from Gonesse to Tergnier, near La Fère. The deficiency of rolling stock and the difficulties of entraining delayed matters so that the first battalion did not leave Gonesse until 10 A.M. on the 18th instead of the 17th, and the last battalion did not get away until the afternoon of the 19th (the day of the battle). In consequence only the 86th Regiment took part in the battle.

Railways may be employed by British troops:

The circumstances in which Great Britain may be involved in war, so as to make the question of railways one of importance, are—

(1) For purposes of defence against a hostile landing on our shores.

(2) In alliance with a European or other civilised Power possessing a railway system (Belgium, Turkey).

(3) For the defence of our Indian or Colonial frontiers, sea and land.

(4) For purposes of invasion of the country of an uncivilised Power (Abyssinia, Afghanistan, &c.).

(1) In defence of Great Britain.

In the first case it is evident that, in these days of fast-steaming vessels, the gain of time is everything. Should we ever be invaded, there can be little doubt that the enterprise will be made suddenly and in great force. It is therefore important for us to employ, from the outset, the whole power of our railway system to pour troops and munitions of war upon the points of the coast where the landing is attempted, in order to nip it in the bud; and, if unsuccessful in this, to take up such positions in rear of the coast as lend themselves to disputing the advance of the enemy towards the capital. So that in England the main question for Staff Officers with regard to railways for war purposes is their employment for strategical concentration, not so much their use for strategical and tactical purposes during the progress of a campaign. In fact,

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our island is so small, the distances between the coast and the capital are so short, the means of subsistence and shelter so ample and so impossible to remove from the enemy's reach, that there is little scope for the strategical or tactical employment of railways when once the enemy has gained a first success.

(2) On the Continent. In the second case, the movements of our troops by rail would necessarily be in the hands of the railway authorities of the Power with which we are in alliance. The main function of the railway in this case would be, so far as we are concerned, to act as an artery of supply.

(3) In defence of India. The third case has much analogy with the first, but the gain of time is less pressing, as the danger of invasion is known longer in advance. Railways here become of importance in the first instance for concentrating towards the threatened point, and secondly as means of supply.

(4) In invasion. In the fourth case, the railway, in the main, serves as a line of supply, and in a secondary way is utilised for the conveyance of reinforcements from base to front, and for the return flow of sick and wounded from front to base.

Duties of Staff Officers in connection with railways: The duties of Staff Officers in connection with the transport of troops by rail may be classed under two heads—(1) administrative, and (2) executive.

(1) Administrative. Under the first head they may be called upon to aid in drawing up time-tables, and making arrangements for the transport of large bodies of troops over a line or system of lines; to decide upon the entraining and detraining stations; and to combine these movements with marches by road.

Staff Officers may be also required to give an opinion as to whether private traffic should continue, or as to the number and order of the trains to be set apart for supplies —opinions which must be based on knowledge as to the power of the railway, the requirements of the troops, and the military exigencies generally.

(2) Executive. Under the second head they may have to report upon a station or group of stations, with regard to the facilities for entraining and detraining troops; to submit plans for the alteration of those stations, or for the erection of temporary platforms; or they may be required to reconnoitre a line in respect to its defence, attack, destruction, or repair, or for the march of troops along it.

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In their executive duties Staff Officers may have to represent the Quartermaster General's Department at the larger entraining stations, at intermediate stations such as large junctions or halting stations, and at terminal stations; or they may be employed on the line of communications. In all cases they would prepare the military details in connection with the movement, allot the platforms, see to the orderly arrival and departure of the troops, and to the immediate clearing from the station precincts of all arriving troops and stores; but at the same time they cannot too carefully eschew interference with the railway executive, especially subordinates, in all matters of detail. "Division of labour and individual responsibility" should be their key-note.

Mutual relations of the Military and the Railway Authorities.

The technical management and working of railways are so complicated, that it would be impossible for any one except those who have been professionally trained to undertake the executive details of a large movement of troops; but Staff Officers require to have a knowledge of these matters sufficient to enable them to bring the military side of the question to bear in their counsel, to understand the limits within which railways can be profitably worked, and to take care that the military arrangements coincide with the requirements of the time-table.

Successful working depends on a correct appreciation of the respective responsibilities of the military and railway authorities.

The army must take care not to demand too much of the railways. It must be remembered that the strength of the railway *personnel* is limited, and cannot be overtaxed without imperilling the order and safety of a heavy traffic; while in the military arrangements even minor irregularities may entail not only risk to the troops, but may lead to incalculable embarrassments. On the other hand, the railway executive must understand the importance of railways for war purposes, and must do their best to meet the requirements of the military authorities.

Staff Officers should confine themselves to telling the railway executive *what* is required; the *how* must be left to those responsible for the execution. The evils arising out of divided responsibility will thus be avoided.

When a railway is serving as the line of communications, too much stress cannot be laid on the necessity for

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all requisitions for transport to pass through the hands of one Staff Officer of the Communications Staff, judiciously selected and permanently told off for railway purposes, as an intermediary between the troops and the railway manager. At each large station there should also be a Railway Staff Officer acting as the channel of communication between the troops and the railway executive, taking charge of the former on arrival and departure by rail, settling informal demands for transport by individuals, and so forth.

Railway regulations in Egypt, 1882.

In order to give some idea of the mutual responsibilities of the military and railway authorities in the field,* we may cite here the regulations which obtained in Egypt during the last campaign.

The Military Railway Corps for the Expedition to Egypt, under the direction of Major Wallace, R.E., consisted of 3 special officers and the 8th Company Royal Engineers—4 officers, 1 warrant officer, 2 buglers, 97 non-commissioned officers and sappers, and 7 drivers.

The Company arrived at Ismailia on the night of the 23rd August, and, after overcoming many difficulties, the line to Tel-el-Mahuta was reopened to traffic on the 28th, and to Kassassin on the 30th. About 2 miles of sidings were laid down to connect the landing places with the existing railway.

On the 31st August the Railway Corps was placed under the orders of General Earle, commanding the line of communications, by whom the following rules were approved for carrying on the railway service:—

(1) The day before the departure of each train 24 trucks to be handed over to the British Commissariat Department to load; 3 to the Indian Commissariat.

(2) Hours of departure of daily trains to be settled by the Director of Railways and put in orders.

(3) As a rule, supply trains will go straight to the Advanced Depôt, only stopping for railway purposes.

(4) The mixed trains (passengers and stores) will take the supplies for intermediate posts.

(5) An Officer or Senior Conductor will be in charge of stores, with way-bills; if by mixed train, the way-bill will show the stores to be delivered at each post.

(6) An Officer or Noncommissioned Officer of Engineers will be in railway charge of each train.

(7) No one to proceed by train without a pass signed by the Commandant of the Base or Advanced Depôt, or a Railway Staff Officer.

(8) As a rule horses and mules will not be conveyed by train.

(9) In the case of ordnance stores, &c., the requisition for transport, stating approximately the weight and cubical measurement, should be forwarded the day previous to the Railway Staff Officer.

* See also p. 261.

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(10) On the departure of each train a telegram should be sent by the Railway Staff Officer to each station where stores are to be delivered, to ensure regular fatigue parties being in readiness.

(11) A similar telegram to be sent by the Commandant of the Advanced Depôt for return trains, if necessary.

(12) In order to secure the regularity of the railway service, it is essential that no person whatever should interfere with the orders of the Director of Railways about traffic, stopping and delaying trains, &c.

(13) The officers employed on the railway will on no account depart from the orders of the Director of Railways, and are not permitted to comply with any requests to stop or delay their trains at any but the authorised points.

In the subsequent operations and move to Cairo, Railway Staff Officers were appointed at each of the large stations—Ismailia, Kassassin, Zagazig, and Cairo.

A.—Administrative Railway Work.

Let us now consider the administrative duties in connection with railways that a Staff Officer may be called upon to perform. It is evident that he may be required to act—(1) in the case of an invasion of England by a foreign Power; (2) for a concentration of troops at a threatened point in or on the frontiers of India or of a colony; and (3) in the case of a railway constructed or seized in an enemy's country, with a view to its utilisation for military purposes.

All these possible cases are very similar as affecting the Staff Officer, and differ mainly in the greater or less extent to which civilians are represented on the Railway Staff. So that we may take for examination the case of a threatened invasion of this country, and it will more or less cover the others.

Railways in the event of invasion of British Isles.

Before we can consider the employment of our railway system to meet invasion, we must first determine the places suitable for the landing of a large hostile force, and this, of course, must be done beforehand in peace.

A landing is a difficult operation, only possible under certain local conditions—protected roadstead, suitable depth of water, favourable condition of beach, means of establishing a base, and suitability of the coast district for assuming the offensive. All such favourable places must be examined and considered in the scheme of defence.

Where there are so many favourable landing-places, as

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in the long coast-line of the British Isles, the defence is no easy matter, and can only be ensured by careful watching, and, when the moment for action comes, by a skilful and well-considered use of the telegraph and of the railways. A railway should traverse the entire coast open to attack, and be connected by numerous transversal lines with the chief centres of the littoral counties, and thence with the main lines of the interior. On the coast itself, at the first threat of war, special measures are necessary, such as the erection of watch-posts, and the connection of these posts by telegraph with the telegraphic network of the country; the laying down of obstructions and torpedoes in the river mouths and other important places, leaving a buoyed channel known only to our own pilots for the entry of friendly vessels; the strengthening of the coastguard with infantry and cavalry for observation purposes; the construction of batteries at places suited for landings to supplement the regular coast fortresses.

At the same time the troops would be mobilised and held in readiness in large units (Army Corps, Divisions, Brigades, &c.) at convenient railway centres: these latter being as a rule coincident with the chief centres of mobilisation. These railway centres would be prepared as entraining stations, in accordance with the units to be entrained; while the detraining stations for each section of coast line would also be determined beforehand, and all preliminary steps taken to commence the conversion of the station or stations in the desired way at the first threat of war.

No troops, except those already there on coast duty, should move from the interior to the coast until the position of the enemy's main landing is known for certain, as he will probably make feints at several points. But directly it is known, and the telegraph should transmit the news at once, not a minute's delay should take place, and the troops should flow to the spot with the regularity of a river. The first trains should consist of a proportion of the three arms, not only to occupy the positions selected for defence and the terminal stations, &c., of the railway, but to aid the local troops in opposing the landing directly.

For a rapid concentration, there should be numerous through lines leading to the frontier or the coast, as the case may be, and these lines must be preserved to our own

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use, by fortifying the chief railway junctions, and must be at the same time denied to the enemy.

It does not follow that all troops should be sent by rail. On the contrary, some of the nearer troops would lose time by the operations of entraining and detraining. The employment of railways is only advantageous when the distance to be accomplished exceeds a certain length, which is variable and must be determined in every case by the amount of troops to be forwarded and the capabilities of the line. Sometimes it may be advantageous to send the infantry by rail, and cause the artillery, cavalry, and train to make forced marches. Particularly may this be the case when the detraining stations are very unsuited for the mounted arms.

Example. In the transport of General Bourbaki's force to the Doubs Valley, in December, 1870, better results would have been attained had part of the troops marched. The line along the Upper Doubs Valley was single, and the small stations hemmed in between the river and the mountain side did not admit of the laying of extra sidings to meet the abnormal traffic.

Before proceeding to consider the arrangements for the despatch of the mobilised troops to the threatened point, let us see how the preliminary arrangements are prepared and matured in peace.

Powers of the Executive over railways.

In the event of war or threatened invasion Her Majesty is empowered, by Clause 16 of the "Regulation of the Forces Act, 1871," to take possession, "either wholly or in part, of any railway with all its rolling stock and plant, or of the rolling stock alone if needed, and supplement the stock of other lines." In such emergency time is everything, and the first condition of success is to arrive in superior force on the pre-determined spot before the enemy. Concurrently with the decree setting the mobilisation on foot, the Government has the power to take supreme control of the railway lines.

Relations of Military and Railway Staff.

In these circumstances, the Quartermaster-General of the Army, assisted by the railway officials of the Board of Trade (ex-officers of the Royal Engineers), would have the supreme direction of the movements of the troops by rail. Such movements would be communicated *to the Railway Managers concerned for execution*; as, railway management being so complicated, it would be neither advisable nor expedient to entrust it to officers of the army. A Staff

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Officer of the Quartermaster-General's Department would, however, be associated with the several Railway Managers for military assistance. Through him all orders would be communicated to the railway authorities, and he would have full power from his own department to regulate the precedence of troops and stores, and to decide as to the most urgent requirements.

The Railway Managers of all our chief lines, as also the principal engineers and railway contractors, are for the most part officers in the Railway Volunteer Staff Corps, formed in 1865. In time of peace, it is the function of the corps to receives from the Head Quarters Staff of the Army *problems* for the concentration of our forces at various sections of the coast. Under the conditions of the military requirements, *i.e.*, with given places of mobilisation, given entraining and detraining stations, and sequence of transport of the units, they work out the arrangements for bringing the various units from their mobilisation centres to the place of strategical concentration (detailing the railway systems over which they have to pass, and the intervals at which the trains can follow one another consistent with safety), so that the force may reach the position before the enemy can occupy it. These arrangements are printed in the form of confidential time-tables, and are kept with the plans of mobilisation and the schemes of defence in readiness for the emergency of war.

In time of war these managers would remain in charge of their own lines of rail, and, on receipt from the staff of the place of concentration and the numbers to be moved, would collect the rolling stock and carry out the transport according to the time-tables prepared in peace.

Thus the railway lines remain under their own experienced staff, who in turn act under the military authorities.

Complete understanding among the railway authorities of the several lines, and between the railway and military authorities of each line, is of paramount importance if the transport is to proceed without hitch or failure.

Arrangements for large transports by rail.

The following recommendations by Colonel Medley, Consulting Engineer for Railways, Lahore, arose out of the experience gained during the railway operations of the Afghan War.

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In all movements of troops and stores there should be complete co-operation between the army department charged with the transport and the traffic department of the railway, especially in the case of the ordinary traffic *not* being summarily stopped.

In arranging large movements of troops by rail in war time, it is necessary to bear in mind the following general rules:—

(1) That the despatch of trains should be regulated in concert with the railway officials and in accordance with the available rolling stock and engine power of the line.

(2) That trains should not be countermanded or their times of departure changed, except on very urgent grounds.

(3) That orders for all trains should be issued from one central office, so as to regulate the precedence of despatch, prevent confusion, and save blocking lines.

(4) That no interference whatever with the railway authorities or with railway rules and regulations be permitted on the part of officers commanding detachments proceeding by rail.

(5) That the despatches of troops and stores should be so regulated that there be no accumulation of these at the terminal stations.

(6) That, in order to avoid waste of time and the locking-up of rolling stock, it should not be considered a hardship for troops to remain in the train for a journey of 24 or even 48 consecutive hours, proper arrangements for their food, water, and convenience being made.

(7) That in order to prevent confusion, troop trains should be marshalled at stations not affected by the troop traffic, and all cantonment stations reserved for military purposes.

(8) That loading platforms should be provided at all the principal military stations on lines of railway, equal to at least three troop specials, viz., 1 for infantry, 1 for cavalry, and 1 for artillery or commissariat, ordnance stores, or live stock transport; the loading banks and sidings being so arranged that the shunting of any one train would not interfere with the next, nor with the ordinary traffic of the main line.

These rules, based on considerable experience, require most stringent observation, especially in those cases where the ordinary traffic is not stopped.

It must be remembered that a railway is a complicated machine, which only works successfully by the mutual adjustment of the several parts. And on a single line in particular, such as our railways in India, only incessant care and rigid adherence to routine can prevent accidents. A single train countermanded, delayed, or running late, virtually disarranges the whole routine of traffic for that day, and increases the risk of accident.

Preparation for strategical concentration must

The points which have to be considered in preparing a scheme for the strategical concentration of a force are:—

(1) Rolling stock: the amount required, necessary

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take account of:—

arrangements for collecting, capabilities of, how far different lines can meet the demands or be supplemented from others.*

(1) Rolling stock.

Whether the rolling stock has to return before the completion of the concentration, either to clear the places of detrainment or for use over again. If the empty trains have to return by the same line of rails, it is evident that considerable delay will ensue, especially if the stations are far apart and there are no shunting places. This difficulty disappears with a double line.

Trains usually run through to their destination, but engines only over the parts of the line the drivers know—"engine runs." Hence the number of available engines on the several "runs" affects the question.

(2) Maximum gradient.

(2) The maximum or ruling gradient: for on this depends the greatest number of carriages that can be drawn at a given speed. In the case of single lines the length of the shunting-places also affects the length of the trains.

(3) Employment of all available lines.

(3) Distribution of operations: so as to employ all lines equally, as far as possible, and leave none idle, care being taken that, with rapid traffic, the lines selected are not coincident for any part of their distance; although they may cross at junctions. Lines which make a wide detour must not, on that account, be rejected, as the extra distance makes comparatively little difference in the time of transport. This consideration acquires weight in the case of large transports causing pressure on particular points.

(4) Time available.

(4) The time available for concentration: and hence the most advantageous combination of marches with transport by rail.

(5) Suspension of ordinary traffic.

(5) Extent to which ordinary traffic is to be suspended. It might not be feasible to suspend all ordinary railway traffic in the neighbourhood of the capital and large manufacturing towns, which derive their staple supplies through the rail.

(6) Capability of the line.

(6) Capability of the railway: rate of travelling, stoppages, time occupied in loading and unloading, and intervals between trains.

Rate of travelling.

The capability of the railway depends chiefly upon whether it has a single or double line of rails. With a double line of way there is the great advantage that the

* In calculating rolling stock allow one-tenth under repair.

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troop-trains can be despatched by one line, while the empty trains can return by the other* without interference. There is no gain in time by using both lines for loaded trains.

The interval between trains on double lines is, by our block system, limited, usually, by the greatest distance between any two sections; on single lines it will depend on the distance between stations, and the interval must be at least double the time taken to traverse the longest distance.

The interval between trains also depends on the amount of available rolling stock, the facilities for marshalling trains, the length of the operation, and the platform-accommodation at both ends. Embarrassment would only ensue were trains to be sent more quickly than their contents could be got rid of at the terminal stations.

According to the latest proposals of the Railway Staff Corps at home, they are prepared on the first day to send the leading Division,† by special troop-trains (see p. 296, *et seq.*), on each line at successive intervals of ten minutes,‡ and at a speed of 30 miles an hour.

In India, taking an example from the time of the last Afghan War, it was found on the Sind Punjaub and Delhi Railway (a single line), that the number of trains per day on the Lahore-Mooltan Section was, with the "Line clear" system, only 13 each way, the crossing stations being in some cases 20 miles apart; while on the Lahore-Delhi Section, with crossing stations 12 miles apart, the number of trains was 17 each way. Each train had a load of 35 vehicles, and a speed of 22 miles per hour, including stoppages for breakfast and dinner.

The arrangements for troop-train halts in England are to allow 15 minutes after the first 4 hours for purposes of nature, and in case of long journeys, when refreshment is necessary, one hour in the course of the journey. At home, as there is no journey over 24 hours in length, the Halts.

* Return line should never be blocked by allowing trains to stand on it.

† For operations in Great Britain, no 2nd Line Transport and no Field Hospitals are taken.

‡ Ten minutes is the limit allowed in Austria for the strategical concentration of the troops, but the trains are longer and the speed is only 30 kilometres (18·6 miles). In the Franco-German War the French despatched trains at intervals of 10 minutes, or even less, during the later operations.

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men can carry cooked rations, and need only halt for coffee. In India cooked rations are carried, otherwise, with long halts, the plant and engines already limited cannot work round quickly enough. Arrangements must also be made to feed and water the animals during transit.

Halts for feeding horses particularly necessary.

Horses that are likely to be in the train for 12 or 18 hours in England, should be watered and fed during the journey under any circumstances, but especially if their services are likely to be required immediately on arrival. A comparatively small quantity is required, but that little should be given.

The jolts, shocks, and scares to which animals are subjected during transit, create such an effect upon some horses that they will not touch food while the train is in motion, and, moreover, they are packed so closely that they cannot be conveniently got at for watering or feeding. Hence they should have their feed during the temporary halts. Half-an-hour's halt would be ample for the purpose.

Inspecting Veterinary Surgeon Walters, A.V.D., recommends "that the feed be confined to oats (crushed, if possible), mixed with a good proportion of sweet hay chaff. Hay, beyond that small quantity in the form of chaff, is not required, and would be unsuited to the occasion; besides which it could not be eaten very well in crowded trucks. The feed should be given in the nosebag, while each truck should carry a couple of pails, to be filled with water at the halting stations."

The main question in the transport of animals generally is to get them to their destination with the least possible delay, especially if required to undergo saddle or draught work on arrival. The cramped position in which they are forced to remain, and the unusual life they are leading, cause them to rapidly lose vigour and energy.

During the Afghan War, when animals proceeded from distant parts of Bombay and Madras to the North-west Frontier, and were sometimes as much as 14 days in transit, it was found necessary to detrain them at intervals for food and rest, otherwise they would have arrived in hopelessly bad condition. Water is especially necessary in hot climates.

A stoppage of 20 to 30 minutes every six hours should be allowed for feeding horses and necessary purposes, the halts at other stations being only long enough for engine

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and station requirements. If longer halts or unnecessary delays take place, the men only become restless.

(7) Selection of halting places, and of stations for entraining and detraining, and provision of suitable accommodation thereat. This latter point is specially important at terminal stations, where trains accumulate and a block ensues, unless unloaded at once. (7) Halting, entraining, and detraining stations.

In India it is often desirable, if not absolutely necessary, to run trains in the night, selecting proper halting-places during the heat of the day. Shelter from the sun and good watering arrangements for man and beast are most important.

(8) The sequence in which the units should be despatched. The troops first arriving to dispute the enemy's landing would be troops of all arms; bodies of cavalry should be in reserve, as the enemy will endeavour to be strong in this arm directly he establishes a footing on the coast. After these advanced troops have been despatched to oppose the landing, the main bodies should be forwarded in complete units. Each brigade should be forwarded to its destination before the other regiments of the Division are entrained. Similarly each Division should be completed before the next Division proceeds, unless, of course, the latter moves by an entirely separate line. Cavalry should, as a rule, go first. (8) Sequence of units.

Brigade staffs should proceed with their leading battalion; divisional staffs after the leading infantry brigade; corps staff follows leading division.

Divisional artillery should follow leading infantry brigade of the division; corps artillery behind the first or second division, as may be thought desirable.

Divisional bearer company should either follow the leading brigade or the second brigade.

Rest of divisional troops, hospitals, &c., should bring up the rear of their respective divisions. Rest of corps troops to follow the rear division.

(9) Arrangements at the detraining stations. At the stations for detraining, the troop trains may either draw up at a series of platforms on the down line, or they may be shunted into sidings. The choice between the two will depend on the nature of the ground. The former plan is often convenient when a road runs parallel to the rail for a considerable distance; in this case the length (9) Arrangements at detraining stations.

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of a troop-train should be interposed between each such platform, and through crossings (from one line to the other) put in so that each train, as it is unloaded, can draw ahead and get upon the other line to return, and so make room for another train to arrive. In the second arrangement the best plan is to have one set of points on the main line leading to a branch one, and from the latter to make the requisite number of sidings.

The detrainment of large bodies of troops should, if possible, be distributed over several stations and portions of railway, so as to complete the operation in the most rapid manner, and to prevent trains from remaining loaded. In detailing the stations for the several operations regard would be had (1) to the convenience in respect of platform-room which the various stations might offer for the different units, and (2) to the facilities for the various units reaching the place of strategic concentration; preference being given to saving the legs of the infantry.

It is impossible to lay too much stress on the absolute necessity of keeping the stations clear of troops, baggage, and stores, especially so when such stations are small, as they usually are near the coast.

The German regulations lay down that troops are not to remain in towns which are departure or arrival stations; they are only to go to the station a short time before entraining, and when detrained they are to march away at once. Stores, likewise, should be removed on arrival.

In 1870–71 one of the greatest defects of the French system was leaving the stores in trucks, and converting the platforms into store-places. The Lyons Railway Company, for instance, had, at the end of the war, 7,500 loaded trucks standing on its lines.

Accumulations of loaded wagons are not only a source of confusion by their presence, but are an indication of a corresponding want of transport at some other place; the block they produce at one spot may mean stagnation elsewhere.

Military stores should never be loaded up or forwarded until their ultimate destination is known; for if wagons so laden are detained, the work in the yard is seriously interfered with; they take up the already limited siding accommodation, impede free working, prevent rolling

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stock being employed or fully utilised for other traffic, and cause general confusion.

When these various points have been duly considered, a "Time-table" is drawn up, in which the number and times of the trains, and the respective entraining and detraining stations are precisely indicated. The times of the returning empty rolling stock, and the times for its new departure reloaded are also regulated. Time-tables and arrangements connected therewith.

Upon the time-table, as a basis, are issued the orders to the troops (in a tabular form), showing the marches of each unit to its entraining station, the hour and minute of the train's departure, the halts and their duration, the time of arrival at the detraining station, and the marches thence to the new position.

The troops have then only to be brought to these entraining stations, embarked, fed, and rested if necessary during transit, and lastly marched to their new position from the detraining station. Any crossing of the troops in their march to and from the stations should be avoided as much as possible. A day before the entraining the troops should be quartered within a convenient distance of the station—5 or 6 miles—the troops to be first entrained being the nearest.

With regard to the number of entraining and detraining stations, the more numerous the better, as troop trains cannot be loaded so fast as they can follow on *the road*. Hence the entraining and detraining should be carried out at several stations or portions of railway,* so as to keep up a constant stream of troops to the front. Number of stations employed.

The next step is the military occupation of the railway with the necessary military stations on the line. The initial and terminal stations, and intermediate junctions are particularly important, for here the men, horses, and wagons accumulate, and other railways join in, and arrivals by the latter must be regulated. Military occupation of railway.

* Any such portion should be within the sphere of operation o the Station Staff, its signals and telegraphs.

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B.—Executive Railway Work.

The executive functions in connection with railways which may devolve upon Staff Officers in time of war, may be classed as follows:—

(1) Arrangements for the entraining or detraining of large bodies of troops; and

(2) The defence, destruction, and reconnaissance of railways for various purposes.

The arrangements for entraining or detraining troops require, on the part of Staff Officers, some knowledge of the construction and working of railways; the nature and capacity of rolling stock, and of the appliances of a station; and also the modes of improvising platforms, ramps, &c., when the existing accommodation is insufficient. These will now be briefly explained.

1.—Railway Construction.

Permanent way. The "permanent way" is the collective name for the sleepers, chairs, fastenings, rails, fishplates, points, crossings, and materials, which form *the road* on which the railway vehicles run.

Line of way. Gauge. The "line of way" signifies the line or track formed of two rails on which a railway train runs. The "gauge" of the line is the clear distance between the inner edges of these two rails.

Six-foot way. The space between adjacent lines of way in this country is generally 6 ft. in the clear between the outside edges of the rails—the *six-foot way*.

Gauge in British Isles. The gauge varies in different countries. The standard gauge of railways in Great Britain is 4′ 8½″ for narrow, and 7′ for broad gauge lines. These latter existed in the systems of the Great Western Railway and the lines affiliated or amalgamated with it, but have been replaced by lines of narrow gauge. So that England and Scotland possess the great advantage of an unbroken gauge on all the main lines of railway. The standard gauge of Ireland is 5′ 3″.

Gauge in British India. That of British India until lately was exclusively 5′ 6″, but now there are two gauges—5′ 6″ for the trunk lines, and the metre (3′ 3·37″) gauge for the subsidiary lines.

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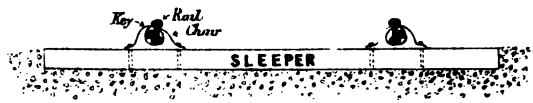
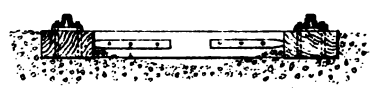
Plate I.

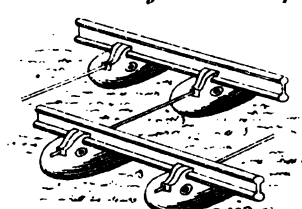
Barlow Rail. Double-Headed Rail. Flat-bottomed Rail. Bridge Rail.



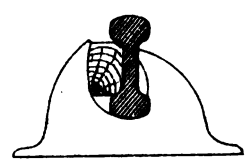
Transverse-sleeper Road. Double-headed Rails.



Longitudinal-sleeper Road. Bridge-rail.

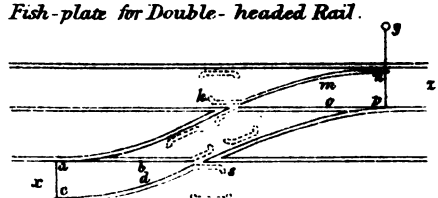


Iron-pot Sleepers.



Double-headed Rail in Chair.

Fish-plate for Double-headed Rail.



Plan of a Cross-over Road, both pairs of points standing right for the straight lines.

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This is very objectionable; the movements of troops and stores are retarded, for at each break of gauge the whole contents of the train must be shifted.

Continental gauges.

The gauge over the greater part of Europe is the same as our standard narrow gauge, but the Spanish gauge is 5′ 6″, and in Russia, where commercial interests have been sacrificed to defensive considerations, 5′. In the United States the gauge varies from 3′ to 8′, but the gauge in general use and to which others are being converted is that of 4′ 8½″. The gauges in Egypt are 4′ 8½″ and 3′ 6″.

United States gauges.

Egyptian gauges.

Advantages of a uniform gauge.

From a military point of view the advantage of having a uniform gauge throughout the country is incalculable, for the rolling stock of any isolated district can be reinforced in case of emergency, while artillery, ammunition, horses, military stores, food and men, can be concentrated at any given point within a short period of time, the rolling stock being able to move anywhere. The difference in gauge between English and Irish railways would be a source of great inconvenience to us in the event of our having to undertake large concentrations of troops in that country, as we could not reinforce the rolling stock from England.

Rails.

There are four kinds of rail in ordinary use (see Plate I):—

The *saddle-back* or *Barlow rail*, is designed to dispense with sleepers and chairs altogether. The rail is laid directly on the ballast, and the ballast is intended to fill completely the inside of the saddle-back. It is vertically weak, and is not well fitted for high speed or heavy traffic.

The other rails are the *double-headed rail*,* which rests in a so-called "chair," holding it upright in place on the sleeper; the *flat-bottomed*† or *Vignoles rail*, which requires no chair, but is fastened directly to the sleeper; and the *bridge-rail*, introduced by Brunel for use with longitudinal sleepers, as on the Great Western Railway.

Sleepers.

The sleepers in general use are of wood or iron, and of three kinds (see Plate I):—(1.) Wooden longitudinal sleepers, laid in the direction of the line, under the whole length of the rail and giving it continuous support; (2.) Wooden cross-sleepers laid transversely to the line

* Usual in England and France.

† Usual in America, Germany, Austria, and Russia.

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and supporting the rails at intervals; their usual dimensions are 9′ long, 10″ wide, and 5″ thick; (3.) the iron-pot sleepers, placed at intervals under each rail, and connected by tie-bars; used on the Egyptian railways, and where a wooden sleeper is open to objection.

A special sleeper was taken out by the Military Railway Corps to Egypt in 1882; it was of $\frac{3}{16}$″ steel buckled plate, and answered very well indeed, being found both strong and light. The cast-iron chairs were screwed to it with bolts and nuts. The keys, instead of being of wood, were wrought-iron spiral springs, slightly tapering towards one end; and were driven into place by an iron core. The advantage of these keys was that they did not fall out, being always in a state of tension and not liable to shrink like wooden ones.

Chairs. Chairs are employed almost exclusively in connection with double-headed rails, and are usually made of cast-iron (see Plate I.).

Fish-plates. Fish-plates* are of iron, about an inch thick, and are placed on each side of the web of the rail, for the purpose of connecting the rails into a continuous girder (see Plate I.).

Points. Points, often called switches, are movable rails pivoted at one end. They are placed at the junction of one line of way with another line of way. These rails are tapered to allow them to fit closely against the rails which do not move, and which are called the "stock-rails." Point rails are usually about 14′ long, but where the diverging curve is very sharp, as is the case in sidings or similar positions, they are much shorter. The heel or pivot end of the point has to be fully two clear inches from the stock rail, in order to let the flange of the wheels freely through.

Cross-over road. The figure on Plate I shows what is called a "cross-over road," which is a short diagonal line with a pair of points at each end, joining two lines of way together.

Crossing. The intersection of the rails is called a "crossing" (*k s* in figure).

The point rails, *ab cd* and *mn op*, are movable, and are usually retained by the point-levers at *f* and *g*, in the position admitting of the passage of the train along the straight rails (as in the figure); the tongues *ba* and *op* fitting closely against the stock-rails, while the tongues

* Derived from the nautical term "fishing," for mending a broken spar by lashing timber on each side of it.

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cd and *mn* are separated from the stock-rails on their side. Now, if a train coming from the direction of *z* is to be shunted to the line *x*, the point-levers must be worked so as to bring *mn* against the stock-rails, and at the same time open *op*. The train now passes to *x* without touching the lever *f*, as the flange of the wheel presses the tongue *ba* away from the stock-rail, and at the same time closes *dc* against the stock-rail on its side. A train from the direction of *x* is shunted to *z* in a similar manner.

Trailing and facing points.

When the train approaches a pair of points from their heel or pivot end they are called "trailing points," but when points are approached by a train so that their thin end and not their heel is first touched, they are called "facing points." The same pair of points are thus called "trailing" or "facing" points, according to the direction from which they are approached by a train. The construction of both is identical; the difference is in the use to which they are put. Trailing points cause a convergence, facing points cause a divergence of traffic.

2. *Working of Railways.*

Signals.

The out-door signals employed in working trains are always two, and sometimes three, in number.

The two signals which are invariably employed are—(1) "All Right" or "Proceed," (2) "Danger" or "Stop." A third and intermediate signal is sometimes given, to signify "Caution" or "Proceed Slowly."

The mode originally adopted, and indeed still in use on many lines, for signalling trains, is that—signalling stations having been erected at suitable intervals along the line—no train is allowed to pass any signalling station until a definite time has elapsed since the clearing of the previous train. But in consequence of the employment of the electric telegraph for working railways, this system of allowing a definite *interval of time* to elapse between trains has given place to maintaining an *interval of space* between trains.

A little consideration will show that there is no safety in allowing an interval of time between trains, for between one signalling station and another an engine may break down, or the train may be prevented in many ways from running accurately to time, and the succeeding train may dash into it.

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A temporary reversion to the time interval system may sometimes be unavoidable, as on the Indian railways during the Afghan war. The "absolute line clear" system usually in force, virtually the same as the block system, had to give way, owing to the greatly increased traffic, to "time intervals." Following trains were despatched at intervals of not less than 10 or 15 minutes.

Under the present system of communication by telegraph between signalmen, each ine of way is divided into telegraphic districts, and it is a rule that no two trains shall be on one district or division of the same line of rails at one time. This is the "block system." In connection with it only two signals need be given to an engine-driver—(1) "All Right" or "Proceed," for the line is clear as far as the next station; or (2) "Danger" and "Stop," because a train is already in possession of the particular division on which the train is about to enter.

Semaphore.

The signal most in use is the semaphore, introduced in 1841 by Mr. C. H. Gregory. It consists of a vertical post, which has one or more movable arms pivoted to it at their upper ends, and these arms are capable of being moved through a right angle. Usually there is but one arm, which, if raised to an angle of 45°, shows that the line is clear to the next station; and if it stands at right angles to the post, that the line is *not* clear. At night the same signal is used, but the two coloured glasses (green and red) at the pivot of the arm cover a lamp in each position of the arm—green, "Proceed"; red, "Stop."

Block system.

The method of signalling known as the "Block System" was originally introduced by Sir W. F. Cooke in 1842, and may be described as follows:—

A railway is divided into telegraphic divisions or districts by signal boxes, in each of which there are signalling instruments, enabling the signalman in it to communicate by electricity with the signal box on each side of him. Thus, taking the case of one line of rails, and supposing it divided into 4 districts, by 5 signal boxes as below—

A will communicate with B, and B with A and C, &c. The districts may be of equal or unequal lengths, as may

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be convenient for working the traffic. The principle of the working is that before A can send a train to B, he must first ask B, if the line A to B is clear. If clear he sends the train and blocks the line between A and B until he hears from B that the train has passed B. Thus, no two trains can be on the same district at the same time.

The system, while as safe as human fallibility can render it, also allows of speed in traffic. Thus the Metropolitan Railway Staff work trains at the rate of 18 per hour on each line of rails, or with average intervals of 3⅓ minutes between trains, while the minimum interval is considerably less. The District Railway Company and the South-Eastern Railway on their Charing Cross line have about the same number of trains per hour on a line of rails; and many other similar instances could be cited. On these lines the length of the district under the control of each signalman is in many instances less than ¼ mile.

In determining the length of the districts, the points to be considered are (1) how much traffic has to be passed over a line in a given time, and (2) in how short a space can a train travelling at the highest speed permissible be brought to rest, with a proper regard to safety and economy in wear and tear of rolling stock.

Rolling Stock.

Principles of traction on railways.

The substitution of the iron or steel rail for the ordinary road diminishes the *friction of rolling* to such a degree that the resistance to motion of carriages on rails is but one-eighth or one-tenth the resistance on the best macadamised road. This advantage has been long recognised by the adoption of tramways; the second step was the employment of steam as a mode of locomotion.

It was some time before men would believe that a carriage, containing an arrangement for turning its own wheels, could by its mere weight draw a number of other carriages. Yet the analogy between the inanimate machine driven by steam and the muscular power of an animal is perfect—each draws a weight proportional to its *friction of sliding*. By virtue of its adhesion to the rails—adhesion measured by the *friction of sliding*—the locomotive can exert an effort of traction varying from

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$\frac{1}{5}$ to $\frac{1}{6}$th of its weight, or of the part of its weight which rests on the axles driven by the connecting rod of the engine.

It is the insistent weight which produces the adhesion of the wheels, that "biting" on the rail, by virtue of which the movement of rotation of the wheel becomes converted into one of progression. If sliding takes place, showing an insufficiency of adhesion in respect of the weight to be drawn, the train will not advance.

In the present day locomotives are used with one, two, three, or four pairs of driving wheels. The weight on each pair, or on each axle, varies from 8 to 14 tons, giving a force of traction of 2,640 to 4,400 pounds per axle.

Resistance to traction.

On a level run the resistances to motion are as follows:—

(1) The resistances due to the *friction of rolling*, proportional to the weight of the carriages, depend on the construction of the axle, grease-boxes, tires, &c., and vary with the state of the rails.

(2) The resistance due to the *action of the air*, which in a head-wind is proportional to the transverse area of the carriages and varies also with the speed. Side-winds also produce a considerable "drag."

On an incline, the force of gravity has also to be taken into account.

The locomotive and tender.

Every locomotive consists of three principal parts—the boiler, the two cylinders with pistons, and the connecting rod. The movement of the pistons is transmitted by the connecting rods, through the medium of a crank, to the axles of the driving wheels, making them turn and advance along the rails. The axle of each pair of wheels is fixed to the wheels, as in all other railway carriages.

The tender, next the locomotive, is a carriage for conveying the fuel and water for the locomotive.* The capacity of the tender varies not only with the kind of engine, but with the length of section over which the engine has to run. These sections ("engine runs") vary from 50 to 120 miles in different countries. In England 80 miles is a short run. On an average, tenders carry 2½ to 4 tons of coal, and a reservoir of 2,000 to 2,500 gallons or more of water.† To supplement these, water-cranes and tanks are placed at varying distances along the line of railway.

* The "tank locomotive" has no separate tender.

† Engine with troop train consumes about 150 cubic feet (930 gallons) of water and 8 cwt. of pit coal per hour.

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An engine can be worked, with a relief of firemen and drivers, for 18 hours out of 24, leaving 6 hours for cleaning, &c.; or it may be worked, with reliefs, from one "shed day" to another—3 or 4 days.

Wagons have two or three axles, and are open or covered. They may be merely large boxes (box-wagons) for the reception of goods, or they may be provided with seats and divided into compartments for passengers. Wagons.

Usually, wagons have parallel axles, the axles being fixed to and turning with the wheels. Hence, in order to move over curves, a certain amount of play must be allowed for the flanges of the wheels.

Trucks are simple open wagons, for the transport of goods and heavy material, such as stone, wood, iron, and so forth. Trucks.

Every wagon and truck forming part of a passenger train consists of a frame, springs, grease-boxes surrounding the axle tree-boxes, buffers, and coupling screws. Usually the wheels are small, and below the level of the platform of the carriage, so that the breadth of the wagon or truck is, within certain limits, independent of the breadth between wheels or the gauge.

Brakes are mechanical contrivances for arresting the speed of a train. This may be done by applying pressure on the periphery of the wheel, or by exerting pressure directly on the rails. Brakes.

As an instance of the latter class—pressure directly on the rails—may be cited the *slipper brake*, an arrangement of levers and screws by which some of the weight of the brake-van or engine is taken from the wheels and transferred to iron blocks, which are pressed downwards, so that they slide like sledges on the rails. This kind of brake, except for special railways on steep inclines, is rapidly giving way to those which are applied directly to the wheels.

Of this latter class there are several—the ordinary carriage brake, set in motion by wheels and lever in the guard's van, and the more complicated modern continuous brakes, like the Smith or vacuum, the Westinghouse or pressure, and the hydraulic.

The system of Westinghouse, Smith, and others, is that of applying or releasing the brake-blocks by the backward or forward movement of a piston. These different kinds

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of brakes chiefly vary in the modes by which the pistons are actuated.

In the *vacuum brake* of Smith, the pistons are worked by atmospheric pressure against a partial vacuum, produced by means either of a steam jet, or an air pump on the locomotive. It is put in action by the engine, and can stop a train of 270 tons going at the rate of 50 miles an hour in 478 yards.

In the *Westinghouse air brake* a pumping-engine on the locomotive compresses air, which is conveyed to every piston by pipes which are flexible between the carriages. This and the Smith brake are automatic, that is to say, they act of themselves when the couplings break. A train of 207 tons moving at the rate of 52 miles an hour can be brought to rest in a space of 300 yards.

The great art in applying a brake is to lessen the rapidity of rotation of the wheels by a gradually increasing pressure, and not to stop suddenly the rotation altogether. Stopping the rotation of the wheels, technically called "skidding," diminishes the retarding power of the brake, and causes the wheels to be unequally worn and lose their cylindrical form where they are flattened by having acted as sledges on the rails.

2. Capacity of Rolling Stock for Military Purposes.

(A)—*Rolling Stock in Great Britain.*

Necessity for careful working out of details.

It may be assumed that our haulage power and rolling stock are sufficient for the transport of a far larger body of troops than we can at present place in the field. It is practically limitless. At the same time, we have not, at any rate in England, worked out the question of transport by rail in all its details; neither have our troops had very much experience in stowing themselves, their horses, and wagons to the best advantage in railway carriages.

On the continent of Europe, where war must inevitably commence with transport by rail, the inside dimensions of every van, truck, and carriage are known and registered. Rules have been made as to what proportions of guns, carriages, and so forth, shall go to each size of truck, so as to economise useless dead load, and also as to the precise mode of placing every service carriage in the truck in reference to the direction of motion, so as to minimise

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damage in the event of breakdown or collision; likewise as to the mode of securing carriages against movement, friction, or shocks in starting and stopping.

Rules also exist applicable to field and other artillery; as to the carriage of ammunition, and its position in the train; as to the loading of provision, hospital, and pontoon trains, the last requiring trucks as long as those for the transport of timber, but with special arrangements for the security of the pontoons.

As with us, the wagons and trucks of ordinary traffic on the Continent carry from 3-ton to 10-ton loads. The minimum thickness of floor for the safe carriage of guns has been fixed abroad at 2 inches, and if found less the floors are strengthened by partially planking over, or the weight distributed over a greater area by placing sleepers or planks under the gun wheels.

These and other facts experimentally ascertained enable the continental authorities, on receipt of a requisition for the transport of a given number of troops and material of any arm, to decide upon the class and number of carriages which will provide the necessary accommodation with the least possible loss of space or useless load.

Classification of vehicles used for military transport.

The various vehicles for the transport of troops may be classed as follows:—

- 1st class carriages
- Composite ,,
- 2nd class ,,
- 3rd class ,,

} For officers and men.

- Horse boxes for officers' chargers.
- Cattle trucks for troop horses.
- Carriage or brougham trucks
- Furniture-van trucks
- Platform trucks
- Ballast trucks

} For guns, wagons, &c.

Our supply of the above carriages and trucks being unlimited, there is no necessity for using the covered goods wagon for men and horses, as is done on the Continent.

Passenger carriages.

A second or third class compartment will hold 8 soldiers in marching order, comfortably, or even 10 soldiers for the comparatively short journeys in this country. So that, according to the number of compartments (4 to 6), a coach holds from 32 to 60 men.

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Abroad, where the passenger carriages are insufficient in number, goods wagons—and more rarely open trucks—after being arranged, if necessary, for ventilation and light, are fitted with movable seats, under which the man places his knapsack and rifle; for long journeys the seats can be removed and the men allowed to lie down on straw.

Horse boxes. Horse boxes are used for officers' chargers, three in each. In comparison with their carrying power, they occupy great platform length—an inconvenience where space is of consequence.

Cattle trucks. Cattle trucks are used for troop horses. The usual dimensions are:—Floor space 14′ 9″, 15′ 9″, and 16′ 6″ long; 7′ 6″ broad; height to top of arched roof 7′ 3″; doorway, 6′ 2″ high, and 5′ 9″ broad, with double door, the lower part letting down to form a gangway; floor of truck 4′ above rails.

For a tall horse, harnessed and with the driver's valise on, 6′ 3″ of doorway height is requisite for him to enter; hence with a doorway of 6′ 2″ the valise must be removed.* A big horse requires on an average 26″ of breadth to stand in when unsaddled, and 31″ when saddled. He is then tightly packed—an advantage. An average horse will occupy 2 inches less.

Horses may be arranged in the trucks either parallel to the rails or tranversely. The latter plan undoubtedly takes less time for entraining and detraining; there is also less strain on the animals when the train moves off or stops. The former method gives more room and protection for the men in the trucks, and is more convenient for feeding and watering. The practice appears to be for horses in cattle trucks to stand traversely to the rails, and in closed goods wagons parallel to the rails.

In the cattle truck they stand with their heads facing away from passing trains, and fastened to the cattle-rings. Horses are more quickly loaded in this way, and as no fittings are required, it is perhaps the most suited for the short railway journeys of England. 7′ 6″ is the least breadth of truck which will admit of a horse standing comfortably; if less, they will be forced to stand askew (see Plate II, fig. 1). Cattle trucks,

* The French estimate for doorway height is:—Any horse unsaddled, 5′ 6″. Light cavalry horse fully equipped, 5′ 11″. Any horse equipped, 6′ 3″.

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STAFF DUTIES.
Page p. 278.

Plate II.

Fig. 1
TRANSPORT OF HORSES
Transversely to Rails.
(Cattle Truck.)

Fig. 2.
TRANSPORT OF HORSES.
Parallel to Rails.
(Covered Goods Waggon.)

Fig. 3.
TEMPORARY PLATFORM.
Of sleepers filled in with earth. Sleeper revetment.
Section.

DANGERFIELD LITH 22 BEDFORD ST COVENT GARDEN

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according to the size of the horse, will take 6 to 8 horses, in some cases with saddles on.

The other mode of transport—parallel to the rails—is usually adopted in the case of a closed wagon, such as is used for the transport of horses on the Continent and in India. The horses in this case are arranged three at each end, with their heads inwards and facing one another. Two removable bars are fitted into the sides of the wagon, 2′ apart, and 3′ from the floor, thus leaving a gangway in which can be placed the saddles, with room for grooms. This arrangement admits of more air for the horses than they would otherwise get, while they can be attended to during the journey (see fig. 2, Plate II).

Trucks for artillery and loaded wagons.

Trucks of which only part of the side opens are not well suited. The sides should open in their entirety; sometimes their ends let down, in which case they can be used for end-loading.

Carriage or brougham trucks.

Carriage or brougham trucks are those upon which goods wagons, farm and agricultural wagons are ordinarily conveyed. They have a platform of 14′ length from cross-bar to cross-bar when placed in end-holes. Their ends (10″ high) let down so that they can be used for end-loading carriages from a dock.

Abroad, most trucks used for the transport of wagons have ends which let down and form a continuous platform; the whole train is thus loaded or unloaded from one end. On many lines the trucks are specially designed to meet military requirements.

Furniture van trucks.

Furniture van trucks are a larger form of the preceding, and have a platform length of 16 feet. Their low ends in some cases let down on the buffers; across these a sleeper is placed, and then they can be end-loaded. Sometimes they have no ends—merely a slight incline.

This truck and the carriage truck will take a field gun and limber, or wagon and limber, a G.S. wagon or two carts (ammunition or tool), interlocked and have a carrying power of 3 to 4 tons. The carriage truck might take a third pair of wheels, but when time is an object and rolling stock plentiful, there is no necessity.

The longest military carriage in the service is the pontoon wagon, which is 9′ 8″ from axletree to axletree, 21′ long over all, and has a track 5′ 10″ in width.

Platform trucks.

Platform trucks are used in the ordinary way for the transport of timber, stone, and machinery, and are adapted for side or end-loading. They have no sides.

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Ballast trucks.

Ballast trucks, the sides of which let down flush with the platform, are suitable for side-loading, not for end-loading. The whole of the side should let down.

Mineral trucks.

The ordinary side-loading mineral trucks are unsuited for military transport, as the openings of the doorway are too small to admit of a pair of wheels, while the sides are too high to lift carriages over, except by the slow process of using a crane.

Many mineral trucks in the coalfields, however, are now made end-loading, when of course the above objection disappears.

Brake vans.

The brake vans, one at each end of the train, hold the baggage and equipment of the troops.

Loading guns and wagons.

In the distribution of guns and wagons all loss of space or useless load should be avoided: they should be lashed and scotched, so as to secure them against movement, friction, and shocks in starting and stopping.

The guns would be unlimbered and run on to the truck, trail inwards; the limber then run on, its shafts also inwards, so that the trail and shafts interlock.

The weight of the loads in the trucks should be so distributed as to give as nearly equal a pressure as possible; otherwise the line of the buffers in adjacent vehicles will differ to perhaps a dangerous extent.

The floors of trucks should be examined before loading. If they appear weak, sleepers or planks should be placed under the gun-wheels to distribute the weights over a larger area.

Loading provisions, stores, and cattle.

For provisions and stores, goods wagons, covered and uncovered, are suitable. Side-loading is preferable, as this arrangement gives more openings to work at.

The load of an ordinary box-wagon may be taken at 1 to 1½ tons hay or straw, 5 to 10 tons of ordinary stores, or 2,000 rations of bread.

Bread should be placed on shelves in tiers, and the truck should be covered and well ventilated.

Wagons containing ammunition, forage, and baggage should be placed near the end of the train, so as to minimise the risk from sparks; but no ammunition should be carried in the three hindermost trucks.

A cattle truck takes 8 to 12 head of cattle, or 30 to 45 sheep, according to the size of the truck and of the animals.

Open trucks, when used for animals, should have sides of a minimum height of 4′ 6″.

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Ordinary passenger coaches may be used for those slightly wounded; but for the badly wounded special ambulance trains, or else goods wagons, fitted up for the reception of stretchers in tiers should be employed. Carriage of sick and wounded.

(B) Rolling Stock of India.

In India troop-trains are made up as follows:— Classification of vehicles used for military transport.

Passenger carriages . . .	European officers and men, and native officers.
Covered goods wagons . . .	Native soldiers and camp followers.
Horse boxes, single and double .	Officers' chargers.
Covered goods wagon . .	Troop horses, pack animals, &c.
High-sided open cattle trucks	
Low-sided open goods trucks	Guns, wagons, &c.
Carriage trucks . . .	
Ballast trucks . . .	
Rail and timber trucks .	

The following remarks apply to the broad-gauge rolling stock on the trunk lines.

The ordinary passenger coaches are used for the transport of Europeans, and, so far as available, for natives also. If there is a deficiency of passenger carriages, natives may be conveyed in the covered goods wagon,* after certain adaptations have been made by the removal of some of the side panels, and by fixing temporary seats. The covered goods wagon will carry 20 native soldiers with arms, &c., or 30 to 35 followers squatting on the floor. Natives generally prefer the latter mode of travelling, as they can thus recline on their bedding. Overcrowding should be avoided in the hot season. Passenger carriages.

Horse boxes, single or double, are used for officers' chargers. Horse boxes.

Troop horses may be carried in cattle trucks, covered goods wagons, or in the high-sided open wagon. The sides of the latter are usually only 3′ 6″. For safety they should be raised by nailing on planking to a height of 4′ 6″, or, better still, 5′. The low-sided open truck is obviously unfitted as being unsafe. Trucks and wagons for animals.

Cattle trucks have a doorway height of only 6′, which is too low to admit Walers (Australian horses). Cattle trucks.

* This description of rolling stock is the most plentiful on all the railways in Northern India.

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Covered goods wagon.

The covered goods wagon is 18′ long, 8′ 6″ broad, interior measurement, has a height of 7′ to roof, and a door 6′ 3″ high by 5′ 6″ broad. For horses, it should be fitted with two breast bars temporarily fixed across the wagon, at a distance of 2′ apart and 3′ above the floor-level. Eight unsaddled Indian horses can be carried parallel with the rails, four at each end facing inwards, leaving space for three or four grooms, forage, and saddlery. The horses enter the wagon by means of a small ramp, or loading-board, which has movable iron catches attached to the sides, so as to fix the doors at right-angles to the wagon, and thus prevent the horses' feet from slipping between the wagon and platform.

For mules, ponies, and bullocks, the load varies from ten to twelve animals, according to size.

These wagons are not, in all respects, satisfactory for the transport of horses, as they are said to be very hot, owing to the sides and roofs being constructed of iron. During transit at the time of the Afghan War many horses were blistered by the heat; this, however, can be remedied by lining the sides with wood.*

High-sided open wagons.

The high-sided open goods wagon will hold, placed transversely to the rails, nine ordinary, or eight of the largest sized horses (Walers), unsaddled, without grooms, but only six Walers when placed head to head. Cattle trucks will carry the same numbers respectively.

Transport of horses.

Stallions should be put in the same wagons with other stallions and geldings. It is well to put a gelding between two entire horses.

* A model horse wagon, built by Mr. Sandiford, Sindh Punjaub and Delhi Railway, has been approved by Government and recommended for adoption on all broad-gauge railways. The inside length is 18′, breadth 8′ 6″. Height of wagon 8′, height of doors 6′ 9″, breadth of doors 5′. The door is in three parts, the lower door-flap, 2′ 6″ high, falling down, forming a bridge between the platform and wagon for the horse to pass over. The breast-bars are provided with two catches, so that they can be fixed at a height of 3′ 9″ from floor for horses, and 3′ for ponies. They allow 6′ 6″ for each horse between breast-bar and end of wagon, thus giving 5′ for grooms, grass, &c. The panels for ventilation slide horizontally, and are 4′ 6″ from the ground, and 2′ 3″ × 3′ in size. The floors are grooved to prevent slipping, and the iron sides of the wagon are lined with boards to a height of 5′. Rings are fitted to the breast-bar to secure the horses' heads. It has been proposed to substitute a ⅜″ chain for the breast-bar, the chain to be covered in leather or other soft substance, as the breast-bars are liable to be broken by a restive horse.

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The Delhi Committee of 1876 (Sir C. Reid's), recommended that horses, as a rule, should be unsaddled when conveyed by rail, for the following reasons: (1) economy in space—one wagon will hold the saddles of a squadron, whilst five more trucks are required when horses are carried with their saddles on; (2) prevention of damage to horses and saddlery—saddles not damaged by chafing, and horses less liable to injury; (3) comfort to animals—as they are not distressed by weight of saddle.

In the case of draught horses the harness should be, as a rule, taken off and placed in a separate wagon. In journeys over twelve hours, it should always be removed. If the operation of entraining or detraining takes place at night, the harness may be left on. The bridles should remain on the horses.

The floors of the wagons must be inspected before the entrainment, as the planks are sometimes broken, or nearly worn through. One-and-a-half inch is the minimum thickness for horses; if less, planking should be laid.

Transport of camels.

Camels are carried in high-sided open wagons. Four or five constitute a load. The most effective way of entraining them is to make them kneel, and, after firmly securing them in that position with ropes and tarpaulins, to hoist them in with a crane. They are placed in pairs at each end facing inwards. Their height necessitates their being carried in a sitting position while the train is in motion, but they should be released and allowed to stand up during lengthy stoppages.

Watering and care of animals in transit.

The difficulty experienced in watering animals during long journeys by rail has led to the following suggestions: That over the ends of open wagons iron troughs should be fixed, to be filled with water every 50 or 60 miles, and that a man should always travel in each wagon with the animals, to supply them with water from the trough.* The animals would thus get water every three hours or so. In covered wagons the troughs should be laid transversely on the floor, the animals helping themselves after the breast-bar has been removed.

At every halt exceeding 12 hours in duration, all animals should be detrained and allowed to take their natural rest. For this purpose extra sidings and loading-

* The troughs must be covered, otherwise the water would soon be jolted out.

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platforms should be arranged, as the efficiency of the transport animals requires that they should make the railway journey with the minimum of discomfort.

Trucks for guns and loaded wagons.

Guns, wagons, and carts are carried on almost any low-sided or open truck, the wheels being scotched and securely lashed. Guns and wagon-bodies are stowed with their trails and perches inwards. Limbers to have shafts resting on carriages, shafts inwards.

A truck 15′ 10″ in length takes 3 pairs of wheels, *i.e.*, 1 gun, 1 limber, and 1 ammunition body; or the longest wagon in the service, the pontoon wagon. A truck 18′ 8″ long takes 4 pairs of wheels. While *Rail trucks*, 22′ feet long and 8′ 4″ wide, will take 5 pairs of wheels, and are specially suited for siege guns.

Loading guns and wagons.

In loading heavy ordnance, care should be taken to equalise the weight on the truck axles, by placing sleepers or planks longitudinally under the wheels, and thus distributing the weight over the floor. The low-sided trucks are sufficiently strong to carry the heaviest siege ordnance used in India. Sometimes it may be more convenient to dismount guns for better stowage.

When carrying pontoon wagons, which requires a loading space of 22′ × 7′ 7″ × 7′, it will often be necessary with trucks having a less floor-space than 19′ 6″ to interpose trucks carrying stores between those carrying pontoons, on account of their great length.

Carts should be taken to pieces before entrainment, as they then pack more closely in the truck—four to six.

Loading cattle, provisions, and stores.

Twelve beasts or 50 sheep can be carried in an ordinary covered goods wagon (if ventilated), a cattle truck, or a high-sided truck.

Covered goods wagons are the best for commissariat stores, but bulky stores, malt liquor, and forage (covered with tarpaulin to prevent being set on fire by sparks), may be carried in open trucks.

The covered goods wagon is capable of carrying any of the following:—375 European privates' field service kits, 680 Sepoy kits, 150 Native cavalry kits, 18 European privates' tents, 36 Sepoy *pals*, seven days' rations for a Cavalry squadron, nine days' rations for a half-battery Horse Artillery, or a wing of British Infantry, ten days' rations for a half-battery Field Artillery, 8 days' rations for a regiment of Native Infantry, or 1 ton of uncompressed hay.

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Powder, as distinct from ammunition, ought invariably to be transported in properly-constructed powder-vans. Artillery and small-arms ammunition may remain in the ammunition wagons and boxes, with tarpaulin well lashed over them, and should be placed towards the rear of the train.

Carriage of sick and wounded.

Covered goods wagons have been used, but are not well suited for the transport of sick and wounded, as the ventilation is insufficient, the springs are stiff, and the roof and sides, being constructed of iron, are very hot. A number of third-class carriages on the Sindh-Punjaub and Delhi Railway have been converted to take stretchers; first-class carriages should be used for severe cases. In the third-class carriages the seats can be removed and replaced by suitable hospital fittings, stretchers or cots; large doors open at the sides sufficiently wide to admit a dooly without moving the patient; each carriage can take 8 cots.

Doolies may also be suspended by slings or straps to the sides of the carriage, as recommended by Sir Charles Reid's Committee.

Doolies, if dismantled and carefully packed, can be carried in the proportion of 24 to each covered goods wagon, and 12 to each break-van.

3.—Stations for Military Purposes.

Requirements of stations for military purposes.

A station to be adapted to military purposes on a large scale requires, according to circumstances:—

Platform and sidings.

(*a*) Abundant platform accommodation and sidings, sufficient to enable the troop units to be entrained and detrained at such a rate that the times of departure of the trains as fixed in the time tables may be accurately kept. There will probably be no difficulty in arranging the platform accommodation for entraining stations, as the places of mobilisation of the higher units are large towns, which are the centres of important railway systems, *e.g.*, York, Chester, Aldershot. But at detraining stations matters would generally be quite different. In this latter case a small railway station, or a group of small stations in the vicinity of our coast, may from the force of circumstances become the terminus of an immense traffic. The existing arrangements possibly are of the meanest charac-

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ter, and sidings, platforms, and so forth, must be improvised with a view to discharging with speed the loads of the arriving trains. Hence, in the choice of stations, whether for entraining or detraining large bodies of troops, we must avoid those in cuttings or on embankments, and those with inconvenient approaches, as such places offer difficulties to enlargement and are unfavourable for the access and egress of troops and their wagons.

As a general rule it will be found more convenient to carry out large entraining or detraining operations, not at the passenger stations, but at the sidings in the goods yards. The passenger platform may be used also whenever practicable, as for instance in the case of a station like Oxford, which has four through lines of rail; where, therefore, it would be possible to reserve the two inner lines for the through up and down traffic, while the two lines adjacent to the platforms could be used for entraining or detraining. With only two lines of way the station platforms cannot, as a rule, be regarded as available, as the trains through a station follow so quickly (every ten minutes), that it would not be possible to carry out any operation at the platform during the short intervals of time which intervene.

In the goods yards will generally be found goods sheds, cattle platforms, docks admitting of side and end loading, long sidings for coal wagons, cranes for lifting weights and stocks of railway material, sleepers, rails, and so forth. For convenience, the roads connecting the yard with the main thoroughfares should be broad and good, and the approaches to the station should be open and clear of buildings.

The goods sheds may be used for entraining either horses or wagons, but generally speaking are more convenient for the former. Cattle platforms should have the pens cleared away. As regards cranes, their rate of working is usually too slow for military purposes, but they may be of use for siege trains and other heavy weights.

In the larger stations the number of sidings is usually far in excess of what will be required even for extensive operations, but in some cases, as for instance at a small station, or when the place of detraining is not at a station at all, sidings may have to be made, besides cross-over roads with points, and so forth.

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The mere lengthening of an existing siding is a simple operation. If the materials are at hand, 200 yards have been laid by military labour in three hours; but if a cross-over road has to be put in for a new siding, more time is necessary. To lay a cross-over road with points at each connection, 12 hours are required if the materials are ready, and the platelayers are in possession of the road for the whole time. If not ready, the time required might be 48 hours from the time of giving the order, as the smiths' work has to be done with great nicety. When the notice is very short a contractor's crossing—in which the rails are movable, one pair of rails lying across the top of the other pair—is the quickest way of meeting the difficulty.*

Alongside the sidings, platforms would have to be constructed, the number and length of such platforms depending upon the number of operations and the composition of the trains.

The want of platforms for the exclusive purpose of loading and unloading trains with troops and stores was much felt in India during the Afghan Campaign, and temporary platforms had to be provided. The experience of the campaign led to a recommendation by the railway authorities that at all stations where troops are quartered, or where rest camps are usually formed during troop transports, there should be permanent platforms of proper height exclusively intended for military purposes.†

(*b*) Sheds and stores for supplies are required at the stations intended as depôts. The supply depôt station would not as a rule be selected within the immediate area of concentration of the troops, but in rear. Sheds and stores.

(*c*) Hospital accommodation for the temporary reception of the sick and wounded must be prepared. These Hospital accommodation.

* In the year 1874, the Russians carried out some experiments near Sebastopol, for converting a small station near the coast into a terminal station. The railway company placed their material at the disposal of the Government for the purpose. The working party consisted of 12 officers and 500 men. They constructed some 6 miles of sidings and put in 27 points and crossings in 32 working hours.

At the Metz Station (July, 1870), which was one of the chief points of concentration of the French forces in north-east France, and a principal supply depôt, the French had upwards of 7,000 yards of rail and sidings, and 2,400 yards available for unloading, yet the station was completely blocked in a few days.

† This recommendation has been since carried into effect.

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arrangements would also be at stations well in rear of the terminal and supply depôt stations.

Water-supply.

(*d*) A sufficient water-supply, both for passing horses and troops and for the engines. An engine drawing a heavy train consumes about 150 cubic feet, or 930 gallons of water per hour; consequently, given the distance to the next watering station and the number of trains passing, the amount of water requisite can be calculated.

An ample water supply is especially desirable at the terminal station, as here the engines can most conveniently re-fill for their return journey. If the tanks be insufficient, a hose may be laid on to a river, a pond, or to wells. If no such facilities exist, the watering of the engines must be distributed over those stations in rear where a water supply exists.

Fuel supply.

(*e*) A Store of Fuel is required.—An engine consumes about 8 cwt. of pit coal or about ¼ less coke, per hour.

Platforms.

Additional platforms usually required for military operations.

The regularity and expedition of a transport of troops by rail depend to a great extent on the platform accommodation. As a rule in England both our sidings and platforms are short, except at stations dealing with large excursion traffic, or in some parts of the coalfields where long mineral trains are common. At very few stations therefore would the existing accommodation be found sufficient. It must be supplemented by temporary constructions. Men, as a rule, can get into and out of the carriages from the rail level, but for the entraining or detraining of horses, guns, and wagons, platforms level with the floor of the trucks are desirable, if not indispensable. Movable ramps can only be regarded as expedients and as supplementary to platforms, for use in those cases where troops have to detrain unexpectedly during transit.

Ramps only expedients.

In the goods-yards of the larger stations there are, as already mentioned, cattle platforms, carriage docks of varying lengths, goods-sheds and long sidings, which with a little adaptation can be used for large operations. Even if the necessary length of platform cannot be obtained on one siding, a second or third platform can be prepared on another siding, and the work thus divided.

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At small detraining stations the character of the adjacent ground must determine in a great measure the arrangements—whether the platforms are to be alongside the main line, or distributed in sidings.

Platforms may require to be constructed either for side loading or for end loading. End loading for vehicles is the most expeditious if the rolling stock is adapted, and, moreover, it admits of better packing. Side loading is advantageous for horses and stores, as there are more openings to work at.

(*a*) *Side-loading Platforms.*

Platform length required for units.

The length of the platforms will depend on the ground and upon the length of the train units. If space can be found for the whole length of a train, so that its contents can be unloaded simultaneously, so much the better. To do this, a cavalry squadron requires a minimum platform length of 213 yards. But if this length cannot be obtained, the train must be broken up into sections and loaded or unloaded at two or more platforms; taking care that the shunting of the several parts to the different platforms, and the subsequent remaking of the train does not block the through line by which the transports are proceeding, or the line by which the empties are returning. The least platform length required for field artillery is 146 yards; for infantry 60 yards.

The longest passenger section			(Infantry) is	135 yards.
ditto	horse	ditto	(Cavalry)	193 do.
ditto	wagon	ditto	(Bearer Co.)	127 do.
Longest train of all is the			Cavalry Squadron	258 do.
Shortest	ditto		Divisional H. Q.	152 do.

The platform lengths for all units are given in the next table.

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Composition and Average Length of the Principal Railway trains for the Transport of Troops on the War Establishment.

Note.—For each engine, with its tender, add 24 yards. Horse boxes, cattle trucks, and carriage trucks are herein estimated at an average of 20 feet each. Each brake van 27 feet.

Class.	Contents of each train.	No. and description of coaches.					Length in yards.				
		Passenger coaches.	Horse boxes and cattle trucks.	Carriage trucks.	Break-vans.	Total.	Passenger section.	Horse section.	Wagon section.	Break vans.	Total, exclusive of Engine, &c.
I.	Divisional Head Quarters	3	15	1	2	21	27	100	7	18	152
H.	Brigade Head Quarters, with its Commissariat, &c.	3	11	11	2	27	27	73	73	18	191
I.	Infantry, Left Wing of Battalion	15	4	4	2	25	135	27	27	18	207
I.	Infantry, Right Wing of Battalion	15	6	3	2	26	135	40	20	18	213
C.	Cavalry Squadron	3	29	3	2	37	27	193	20	18	258
A.	Horse Artillery, ½ Battery	4	16	8	2	30	36	107	53	18	214
A.	Field Artillery, ½ Battery	4	14	8	2	28	36	93	53	18	200
H.	Divisional Ammunition Reserve, ⅓ of Column	3	12	13	2	30	27	80	87	18	212
C.	Field Company Engineers	6	10	6	2	24	54	67	40	18	179
C.	Corps Engineers, ½ Field Company and ½ Field Park	5	9	7	2	23	45	60	47	18	170
C.	½ Pontoon Troop	4	14	8	2	28	36	93	53	18	200
C.	½ Telegraph Division	4	14	8	2	28	36	93	53	18	200
H.	½ Bearer Company	5	9	19	2	35	45	60	127	18	250
H.	1 Field Hospital	4	9	11	2	26	36	60	73	18	187
H.	Divisional Commissariat and Transport train (maximum) ...	2	10	16	2	30	18	67	107	18	210
H.	Army Corps ,, ,, ,, ,, ...	2	10	15	2	34*	18	67	100	18	236
H.	Army Corps Ammunition Column, each half-section	4	12	16	2	34	36	80	107	18	241
H.	Ordnance Store train...	5	10	10	2	27	45	67	67	18	197
H.	Medical Department, Cavalry Brigade, E. 18	4	8	18	2	32	36	53	120	18	227
H.	Commissariat Department, Cavalry Brigade, E. 19	3	11	18	2	34	27	73	120	18	238

* Including five goods trucks.

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STAFF DUTIES.
Face p. 291.

Fig. 1.

Plate III.

TEMPORARY PLATFORM

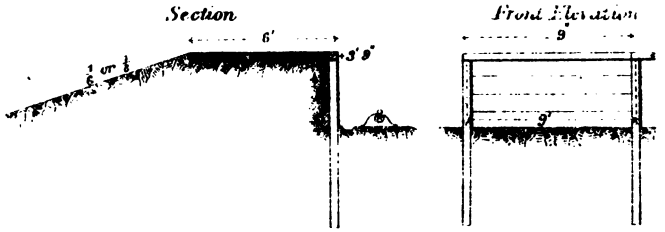


Fig. 2.

VOLUNTEER REVIEW 1881.

Infantry Platform at Datchet Station.

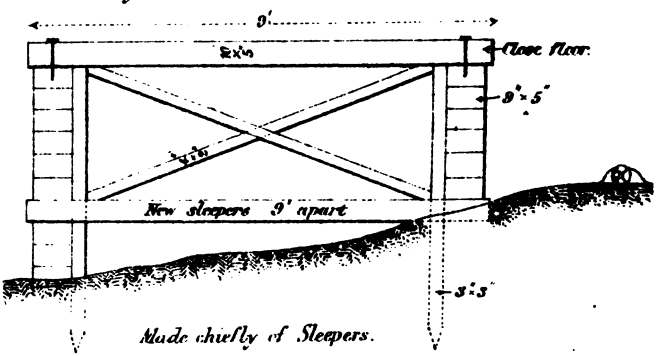
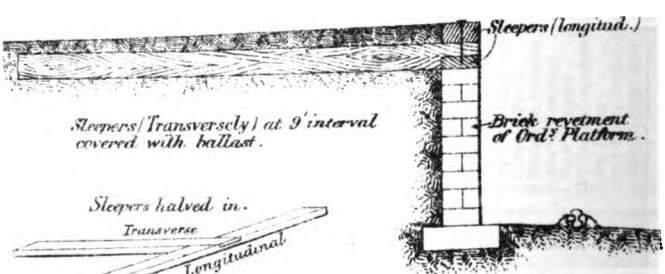


Fig. 3.

Mode of raising a low platform.



DANGERFIELD LITH 22 BEDFORD ST COVENT GARDEN

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In April, 1880, the Railway Volunteer Staff Corps reported that the most expeditious mode of constructing temporary platforms for horses and guns, when timber and labour are abundant, is to build them of sleepers and timber. The platform figured in Plate III, fig. 2, which was erected by the South Western Railway at Datchet Station in 1881 for entraining and detraining men is a type of this class. For horses and guns it would have to be somewhat stronger, and of greater width. Construction of timber platforms.

If sufficient timber is not available, the platform may simply consist of earth held in place by a revetment of sleepers in front and rear (see fig. 3, Plate II), ramped at the end in order to get access to it. Such a platform would be suitable when one has to be constructed in a narrow place between two sidings, but if not so situated it will be more convenient to ramp the reverse side of the platform, so as to allow of access to it at all points. This slope prevents all danger to refractory horses in case they back and refuse to enter the wagons. The least amount of level flooring, measured from the face of the revetment, for entraining may be taken at 6 feet, and then ramped off at $\frac{1}{4}$ or $\frac{1}{3}$; for detraining 3 feet will suffice (see Plate III, fig. 1). Earth platforms.

In the platform shown in Plate II, fig. 3, the face and reverse side are of sleepers or other timber, 3′ 6″ above the level of the rails, held in place by, and fastened to, sleepers sunk into the ground to support the fabric. The framework thus formed is filled in with ballast or earth, and the surface boarded over with sleepers laid diagonally, while there is a ramp at one end to give access.

A platform of this kind 124′ long by 25′ wide, composed of timber front and back, filled in with earth and boarded with sleepers, was constructed in 8 hours, although the earth had to be brought from a distance of 45 miles. 112 men were employed on the work. Two ballast trains were used, each truck carrying $3\frac{1}{2}$ cubic yards ballast.

Sleepers 9′ long were sunk 6′ into the earth at intervals of 9′ apart, centre to centre, and the revetting sleepers were bolted to them with the ordinary chair-bolts; 883 sleepers in all.

A slight cutting favours very greatly the formation of these earth platforms.

It is desirable in all cases to have a flooring of sleepers, Timber flooring desirable

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as with heavy rain a newly-formed platform of loose earth soon becomes useless. If the supply of sleepers runs short, a flooring may be made of hurdles covered with rammed earth, but it does not last. In default of wooden flooring well rammed ballast is the next best material.

Platform when points, &c., are in the way.

Another platform 18′ long, 3′ 6″ high, with a slope to the rear of $\frac{1}{6}$ (therefore $31\frac{1}{2}$ feet in breadth) was constructed entirely of sleepers (180) by 15 men in $1\frac{1}{2}$ hours. This arrangement is applicable to short lengths of platform, where, owing to the presence of rods and actions of signals or points, which are necessary for the working, earth cannot be employed.

Height of platform.

For wagons and horses the platform should be 3′ 6″ high, as the platform is then on a level with the floor of the truck.

Mode of raising platform to required height.

In some stations, however, especially on the older lines, platforms only 2′ 6″ high are met with. These may be readily raised with sleepers and earth as follows (see Plate III, fig. 3):—Along the coping of the existing platform lay a row of sleepers longitudinally. Into the middle of each sleeper is halved a tie-sleeper, placed transversely to the coping. A second layer of sleepers breaking joint with the first, and bolted to them, will raise the platform about a foot. Then fill in with ballast and a flooring of sleepers.

It is much better to raise the platform in this way than to make up for the difference in height by using portable inclined planes for the horses to walk up.

(*b*) *End-loading Platforms.*

Advantages of end-loading for vehicles.

The platforms hitherto described have been side-loading, but as there are many trucks among the rolling stock of railway companies intended for, or capable of, end-loading, and as the latter system is more expeditious for entraining and detraining vehicles generally, some additional remarks are necessary.

Employed on Continent.

On the Continent, as already mentioned, the rolling-stock is, to a very large extent, intended for end-loading. The ends of the trucks let down over the buffers, forming a continuous platform from end to end, along which the vehicles are passed by hand in succession.

Recommended for India.

The Indian Committee of 1875–76, of which General Sir Charles Reid was president, advocated end-loading

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for vehicles, on the grounds (1) that by means of a single portable ramp vehicles could be entrained or detrained anywhere, even on the open line; (2) that a great saving in time is effected; and (3) that vehicles can be more closely stowed in the trucks.

The chief difficulty in India is that the bulk of the rolling stock is not adapted for end-loading, and that the alteration of the rolling stock would be too costly. In England the carriage and platform trucks, and some of the mineral trucks are adapted for end-loading.

It will be necessary, therefore, in our own case, when making preparations for a large military transport, to be ready to send or receive end-loading as well as side-loading trucks.

End-loading platforms.

For end-loading purposes there is at most stations a "dock" for the reception of carriage and platform trucks, horses, and cattle. It commonly holds two to four coaches at a time, and is sometimes hampered with turn-tables, &c., and so placed as not to lend itself to a large military transport. Where impediments exist to the dock being lengthened, it will be sometimes more convenient to convert the "butt" at the extremity of a siding into an end-loading stage, by removing the top of the butt and building a gently-sloping ramp on to the end. These end-loading platforms should also be at least 3′ 6″ above the top of the rails.

Lighting platforms.

When new platforms are constructed it is of importance not to forget that means of lighting must be provided. Usually the gas pipes can be carried on to the new platform. The lights should not be less than 7 or 8 feet from the ground, and at a distance of 18 or 20 feet from the carriages, so as to be clear of the operations.

(*c*) *Ramps.*

Ramps.

Portable ramps are of service when ordinary platforms are not available. They may be used for horses or wagons.

Most continental railways are provided with ramps, which are used in lieu of platforms, or can be carried in the train with the units. In India and in England experiments have also been made with various contrivances of this nature.

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French portable ramps.

The French have two descriptions of portable timber ramps, the one intended for station use, and the other to be carried in the train and used at any part of the line.

The first is shown in Plate IV, fig. 2, *a*. It consists of a rectangular frame (fig. 2, *b*), 3′ 3″ high by 10′ 9″ broad, placed parallel to the rails, and at a distance of 3′ from the nearest rail. At right angles to the top of this frame are placed four baulks, 18′ long, the other ends of which rest on the ground. The baulks are attached to the four uprights of the frame by eight braces. Upon the baulks is fixed a superstructure of planks, and the whole is rigidly connected together. The top of the superstructure is 3′ 9″ above the level of the rails. The upper part of the ramp and the platform of the wagon is bridged over by two *ponts volants*, each 4′ 11″ long by 4′ wide. The weight of the whole is 29½ cwt. It can be used for horses or carriages.

The second kind of ramp, for use on the open line, is also intended for horses or carriages, which can be entrained or detrained either at the side or end. It consists of two iron girders (*longrines*), in shape like a double T, 16′ 6″ long, with claws at one end to hook on to the truck. Upon the two girders is placed a superstructure of planks, 7′ 10″ in width (see Plate IV, fig. 1.)

German portable ramp.

The Germans employ a ramp mounted on wheels for loading or unloading guns and waggons at small stations or on the open line. It is simply an inclined plane on wheels, 18½′ long and 6′ wide. By means of a screw its loading end can be adjusted to different heights. The framework is of T iron, overlaid with planking (see Plate IV, fig. 3.)

With these ramps they are able to detrain anywhere in a short space of time.

Recommendations of Willesden Committee.

The Willesden Committee recommended that if artillery are likely to be detrained during transit, they should have with them in the train skidding 15′ long, and planks for the purpose; but a better plan would be to have some oak planks 14′ × 12″ × 3″, with claws at the end to grip the edge of the truck. For the horses some kind of portable ramp will be required.

Various kinds of ramps were experimented on by the Indian Committee (see Plates VI and VII, facing pp. 300–301), the nature of which is sufficiently explained by the drawings.

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STAFF DUTIES.
face p 294.

Plate IV.

Fig 1.

FRENCH GIRDER RAMP.

(Work on open line.)

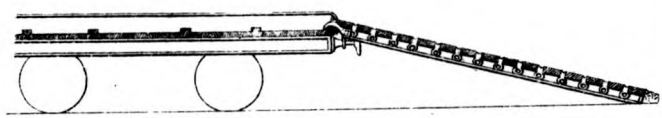

Fig. 2 (a)

FRENCH PORTABLE RAMP.

(Station Work.)

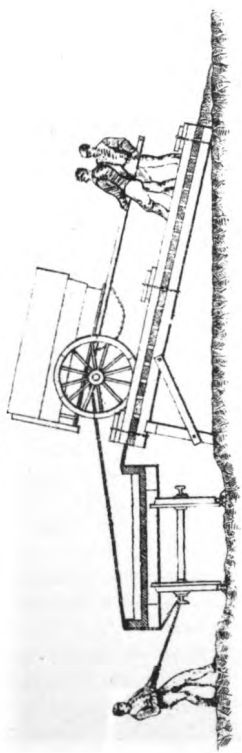

Fig. 2 (b)

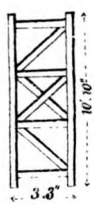

Fig. 3.

GERMAN PORTABLE RAMP.

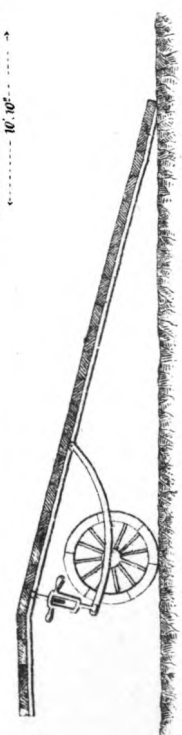

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Fig. 1.

TEMPORARY RAMP.

For Entraining Guns.

(End-loading)

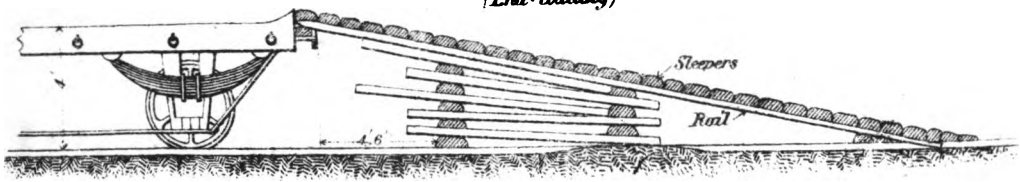
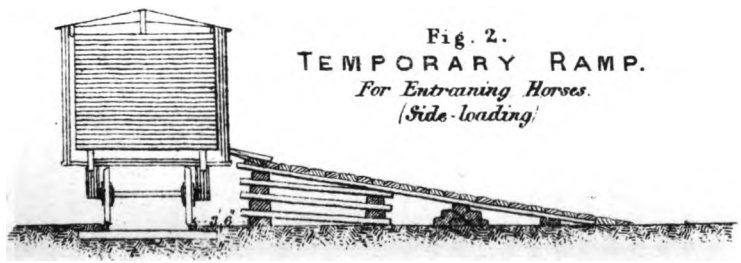


Fig. 2.

TEMPORARY RAMP.

For Entraining Horses.

(Side-loading)



DANGERFIELD, LITH 22, BEDFORD ST COVENT GARDEN

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In 1880 some experiments were carried out by the Royal Artillery at Aldershot, with a view to seeing how the ordinary materials found at nearly every station could be used for improvising ramps. Ramps were made of rails and sleepers, built up as shown in the diagrams in Plate V. Aldershot experiments.

An end-loading ramp (fig. 1) was formed of two 21 or 24-feet rails, placed 6′ 6″ apart outside the permanent way rails, their upper ends resting on a sleeper placed across the buffers of a carriage truck, and their lower ends on the ground. To give these rails support—for otherwise they would have been too springy—sleepers were built up in "gridiron" or "crib" form, the first sleeper nearest the truck being placed across the permanent way rails, and at a distance of 4′ 6″ from the end of the truck buffers. The next sleeper was placed transversely to the first, and vertically under the ramp rail. The remaining sleepers were arranged in the same way, as shown in the drawing. After the rails were supported in this way, a roadway of sleepers was placed transversely. Gun ramp.

Some 12 to 18 sleepers will be required for the ramp, and 25 for the flooring.

Drag ropes should be used to check the guns in descent, the men remaining in the trucks.

A side-loading horse-ramp was constructed on the same principle (Plate V, fig. 2). The length of rail used was 24′, but a shorter one of 14′ would answer the purpose. Horse ramp.

The loading end of the ramp was 3′ 8″ above the top of the permanent way rails. Some 12 to 18 sleepers were required for the ramp, and 26 for the flooring.

Composition of Trains.

The trains for the transport of large bodies of troops are collected or "marshalled" at some station near to the one at which the troops are to be entrained, not at this latter station, as the accumulation of a mass of rolling stock might hamper the freedom of the operations. Marshalling stations.

Each troop-train consists of an engine and tender, and a certain number of vehicles made up into three distinct sections called the passenger, the horse, and the wagon sections. The object of keeping the sections separate is that, in the event of the platform being short, those sections which are less easy to detrain may be halted alongside it. The position of the platforms at the Trains made up in sections.

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detraining station may also require trains to be made up at the entraining stations with the sections in certain sequence; this should be notified to them beforehand.

Length of trains and speed.

In Great Britain the make up of a train is spoken of as so many coaches. On the Continent the length of trains is usually designated not by the number of vehicles but by the number of axles, owing to the coaches being of different lengths, and therefore of a varying number of axles.

We employ short trains of 24 to 37 vehicles with a comparatively high speed of 30 miles an hour, while they use heavier trains up to 120 axles, or in other words, trains of 40, 50, 60, or even more vehicles, with a lower speed of some 15 miles an hour, including short stoppages.

The railway authorities in England prefer the lighter train, as they say the heavier train is more liable to accidents, is less under control, while the effects of an accident are more disastrous.

Infantry train.

The composition of trains for the chief units, according to the official programme, is as follows:—

Battalion.

Left Wing.	*Right Wing.*
1 brake van with baggage,	1 brake van,
1 1st class carriage,	1 1st class carriage,
14 2nd or 3rd class (560 men, 4 on each seat,	14 2nd or 3rd class (560 men),
1 horse box (3 horses),	3 horse boxes (9 horses),
3 cattle trucks (21 horses),	3 cattle trucks (21 horses),
4 wagon trucks (wagons ammunition carts, &c.),	3 wagon trucks,
1 brake van (baggage),	1 brake van,
25 vehicles.	26 vehicles.

Cavalry train.

Cavalry Regiment in 4 trains, each as follows:—

1 brake van,
1 composite carriage (1 compartment for officers),
2 2nd or 3rd class (100 men, 5 on each seat),
1 horse box,
28 cattle trucks (168 horses),
3 wagons trucks (wagons and ammunition carts),
1 brake van,

37 vehicles.

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Horse Artillery in 2 trains, each as follows:—
1 brake van,
1 composite carriage (1 compt. for officers),
3 2nd or 3rd class (120 men, 4 on seat),
8 wagon trucks (gun and ammunition wagons),
15 cattle trucks (90 horses),
1 horse box,
1 brake van,

30 vehicles.

Field Battery in 2 trains, each as follows:— Artillery train.
1 brake van,
1 composite carriage,
3 2nd or 3rd class (120 men, 4 on seat),
8 wagon trucks,
1 horse box,
13 cattle trucks (78 horses),
1 brake van,

28 vehicles.

Company Royal Engineers. Engineer company train.

1 brake van,
1 composite carriage,
5 2nd or 3rd class (200 men, 4 on seat),
6 carriage trucks,
3 horse boxes (9 horses),
7 cattle trucks (42 horses),
1 brake van,

24 vehicles.

Pontoon Train.—Three trains as for 9-pr. Field Battery. Pontoon and telegraph trains.
Telegraph Troop.—Two trains as for 9-pr. Field Battery.

Each train has a special mark (see Table next page). Marks on trains to distinguish units conveyed. Thus the divisional trains are numbered in a series from 1 to 39, the letters A, B, C denoting the 1st, 2nd, and 3rd Divisions respectively. The trains D 1, D 2, and D 3 are for the Army Corps Staff. Trains E 1 to E 17 are Cavalry Brigade trains; F 1 to F 16 are Corps Artillery trains, and so forth.

In a movement of troops the Railway Staff Officer, after preparing the time-table, and deciding the sequence of the units, fills up a form showing the times of departure, the sequence of the units, the contents of each train, and the composition of the train in carriages, trucks, &c. One copy of this is given to the officer of the Quartermaster General's Department belonging to the

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force concerned, and another to the traffic manager of the line. The latter will then have the trains made up in conformity with the table, with their letter and number marked on them.

Railway trains for an Army Corps.

Railway Trains required for the Transport of an Army Corps.

War Establishment.

Mark.	Contents of Trains.	No. of Trains.
D.	General Staff	2
1–3	Special for Generals	1
E.	**Cavalry Brigade.**	
1	Head Quarters of Brigade	1
2–5	Squadrons of 1st Regiment	4
6–9	Squadrons of 2nd ,, ...	4
10–13	Squadrons of 3rd ,, ...	4
14–15	Horse Artillery Battery	2
16	Medical Department (½ Bearer Company)	1
17	Commissariat and Transport...	1
F.	**Corps Artillery.**	
1–6	Horse Artillery Batteries	6
7–10	16-pr. Batteries and Head Quarters Corps Artillery ...	4
11–16	Corps Reserve Ammunition Column (total)	6
G.	**Corps Engineers.**	
1–2	Company Field Park and Staff	2
3–5	Pontoon Troop	3
6–7	Telegraph Division	2
H.	**Medical Department.**	
1	½ Bearer Company	1
2–7	6 Field Hospitals and Staff	6
J.	**Commissariat and Transport Department.**	
1–6	Transport and Supply (exclusive of 8th Company) ...	6
7–13	Transport, 8th Company, with tents and Veterinary Department	7
K.		
1–2	Bakery Train	2

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Railway Trains required for the Transport of an Army Corps.

War Establishment—continued.

Mark.	Contents of Trains.	No. of Trains.
I. 1–3	Ordnance Store Department	3
	Divisional Trains.	
A.	First Division.	
B.	Second Division.	
C.	Third Division.	
1	Staff of Division	1
2–3	Staff of 1st and 2nd Brigades	2
4–17	7 Battalions of Infantry	14
18–21	Cavalry Regiment	4
22–23	Field Artillery, 9-pr. Battery	2
24–27	Field Artillery, two 16-pr. Batteries	4
28–30	Reserve Ammunition Column	3
31	Field Company, Engineers	1
32–33	1 Bearer Company	2
34–35	2 Field Hospitals	2
36–39	Commissariat and Transport	4
	Total for a Division...	39
	Recapitulation.	
	Army Corps Staff	3
	Cavalry Brigade	17
	Corps Artillery	16
	,, Engineers	7
	,, Medical Department	7
	,, Commissariat and Transport and Veterinary Department	15
	Ordnance Store Department...	3
	3 Divisions, 39 each	117
	Total for an Army Corps	185

In Germany the usual load is a train of 100 axles, with a speed of 13·8 to 18·4 miles per hour. In calculating the rolling stock required for a given unit the estimate is to allow one axle for every 10 officers, or 16 men, or 3 horses and a man, or ½ gun or wagon, or ⅓ pontoon. Length and speed of German trains.

An army corps complete is carried in 90 trains, an infantry or cavalry division, without train, in 20 trains.

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Length, speed, and carrying power of Indian trains.

In India each train, consisting of 35 vehicles, and running at a speed of 22 miles per hour, exclusive of stoppages, is estimated to carry the following units or portions thereof:—

(1.) A third of a British or the whole of a native infantry regiment, with followers, baggage, tents, and ammunition complete.

(2.) One and a half troops of cavalry, with the same.

(3.) Half battery of horse or field artillery, with the same.

(4.) Battery of mountain artillery, with the same.

(5.) One company of sappers and miners, with half of a pontoon or telegraph troop.

The maximum number of vehicles, 35, is estimated for ordinary gradients, not, of course, for steep inclines, when probably the train would have to be broken up into two portions. It does not follow that the number of vehicles will necessarily be 35. This will depend on the strength of the corps, the nature of the campaign, whether for Indian or foreign service, and according to whether the scale of equipment is "hot weather" or "cold weather."

When proceeding to a port trains should correspond with ship units.

It is desirable, in the event of the troops proceeding on foreign service from a port, that the train units should correspond with the ship units, so that the troops may be embarked at once, proceed to sea, and disembark ready to take the field in every particular.

More carriages proportionately required in India.

It will be observed that more vehicles are required for the transport of the troop-units in India than in England. In addition to the extreme heat at certain seasons of the year, the distances to be travelled are so much greater, that extra space must be allowed to admit of the men taking a certain amount of rest during the journey, otherwise the trains would have to be halted for 8 out of every 24 hours. Again, the camp equipage is more bulky, the doolies, unknown in England, require more space; and, lastly, the number of camp followers that accompany troops augment the force to be carried.

Time Occupied in Entraining and Detraining.

Times estimated in the Regulations.

The time occupied depends on the nature of the rolling stock, but mainly on the extent of available platform

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Plate VI.

RAMPS USED FOR LOADING HORSES.

(SIR C. REID'S COM.)

End Elevation.

Fig. 1(a)

Longitudinal Elevation.

Fig. 1(b)

DANGERFIELD. LITH. 22 BEDFORD S^T COVENT GARDEN

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STAFF DUTIES
face p. 301.

Plate VII.

Fig. 1(a)

Girders used for loading Guns.

(Sir C. Reid's Com.)

Side Elevation.

Proposed Alteration.
Fig. 1(c)

Longitudinal Elevation.
Fig. 1(b)

1325.

Dangerfield Lith. 22. Bedford St. Covent Garden

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room. In the "Regulations for the Line of Communications" the scale for entraining is estimated at—40 minutes for an infantry train, 1 hour for a cavalry or artillery train, and 80 minutes for a heavy train. This is based upon the results of actual practice.

The maximum time required under ordinary circumstances for *entraining* a half battalion of infantry with its share of regimental transport may be taken at 40 minutes, and a squadron of cavalry or half-battery of artillery at 60 minutes.

For *detraining* and marching clear of the station a half-battalion of infantry requires 30 minutes, a squadron or half-battery 40 minutes for continuous work.

Willesden experiments with infantry and cavalry.

In some experiments carried on at Willesden, the circumstances being favourable, the units weak, and unaccompanied by regimental transport, it was found that an artillery train was loaded in 30 minutes. A cavalry train, horses unsaddled (in low-door trucks), took 1 hour to entrain and 42 minutes to detrain; when saddled (in high-door trucks), an average of 25 minutes to entrain or detrain.

Aldershot experiments with field artillery.

In the experiments at Aldershot, 1879–80, on half-batteries of artillery,* the guns and horses were entrained simultaneously on separate platforms, 20 to 25 men being told off for the guns, and the remainder for the horses. Guns were end-loaded, horses side-loaded.

A certain time was occupied in telling off and marking the carriages and trucks to the different sub-divisions—10 minutes.

From the time the order was given to dismount and unhook until the half-battery was entrained, an interval elapsed on an average of 20 minutes.

The putting together of the two parts of the train, getting clear of the station, and bringing an empty train into the same position for a fresh operation would occupy about 15 minutes at the least, provided the sidings and points are all clear and available.

In detraining, ramps made of rails and sleepers were

* Strength as follows:—3 guns and 3 wagons, 2 wagons (forge or stores), 66 troop horses, 3 officers' horses, 88 officers, non-commissioned officers, and men. Train composed of 1 valise van, 3 passenger carriages, 1 horse box, 11 cattle trucks, and 8 carriage trucks. In all 24 coaches. Length 168 yards, without engine, tender, or break van.

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used, as figured on Plate V. Seven minutes were spent in placing the two portions of the train in their respective positions. The gun ramps were built in 7 to 9 minutes, the horse ramps in 8 to 14 minutes, and the guns, &c., were all out in 18 to 36 minutes, horses all out in 21 to 35 minutes. To remove ramps, clear away and march off occupied 29 to 42 minutes.

Indian experiences in entraining.

Cavalry.

When entraining at Umballa to proceed with the expedition to Malta in 1878, the average time occupied in loading up a squadron of cavalry was about 1½ hours, but with platforms of sufficient length this could have been easily reduced to one hour.

When proceeding to Afghanistan the time occupied by two squadrons was just under an hour. As a rule, there was a greater delay in trucking the grass-cutters' ponies than the troop horses; many of the former had to be pulled into the vehicles by main force.

Artillery.

No opportunity occurred for fairly ascertaining the time taken in loading guns. But in one case a half-battery, including bullocks and natives, and all baggage and equipment, took 1 hour and 20 minutes to entrain.

Defence and Attack of Railways.

The importance of railways, both to the invader and the invaded, necessitates on the part of the Staff Officer a close study of the means by which these valuable adjuncts to the operations can be preserved to the use of his own army and denied to that of the enemy.

In the event of an invasion of England, much will depend on our strategical concentration being carried out without let or hindrance. Troops during their transport by rail are powerless to act, and it is therefore evident that the lines of rail by which the troops arrive must not be left open to the enemy's incursions. On the other hand, the light troops of the invading army will do their utmost to destroy the coast railways and hinder our concentration, in order to gain time for the landing of their main forces.

Let us consider first the defence of railways.

Defence of Railways.

Defence dependent

The defence must depend to a considerable extent on

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the probable nature of the attack. In America, where the lines of rail were exposed to the raids of large bodies of cavalry, isolated sentries were of little use; a carefully prepared system of signalling, a sharp look-out and strong flying columns afforded the best chance of security. In France, where the railways in German occupation were harassed by the raids of Franc-tireurs, the lines were found to be best protected by sentries thrown out in advance, by the constant patrolling of small parties, and by dealings with the inhabitants either in the form of rewards for information given, or by reprisals if damage was done. But even these measures were not always sufficient. The Franc-tireurs who operated against the railways from the secure base of the fortress of Langres did not cease giving trouble until hostilities were finally suspended between the two nations. On nature of attack.

At the first threat of war the protection of the terminal railway stations in the zone of concentration becomes of paramount importance; likewise the supply stations, important junctions, &c. These, it is needless to say, must not only be occupied by a force, but the villages round must be held and outposts thrown out beyond, while the vicinity of the station itself, forming the *réduit* to the whole, should, if time admits, be fortified with field works. The railway stations in rear would also be occupied, and the line between watched and patrolled, and the important works of construction (bridges, tunnels, viaducts, cuttings, &c.) carefully guarded. No part of the line should be liable to injury during the period of strategical concentration, as a partial destruction of the permanent way, unimportant and easily repaired in ordinary times, would cause delay and embarrassment at this critical stage of the operations. Protection of terminal stations.

Besides the terminal points, supply depôts, &c., on the lines of concentration, we must in Great Britain take precautions for the safety of those lines which run parallel to and near the coast,* and which will evidently be of so great moment for local defence against invasion. These lines are especially open to the enterprise of small parties landing at night, or to the *coup de main* of larger detachments by day. At the first threat of war these lines would have to be protected by works near Protection of coast or frontier railway.

* These remarks apply equally to frontier railways.

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the available landing places, and by constant patrolling; while the tunnels, and so forth, where the enemy could create a breach, would have to be occupied by troops. Such points must be known and designated beforehand, so that at the first sign of war, the peace preparations may take actual form.

Serious results following neglect of precautions.

We must not forget the lesson taught the French in 1870, when the important viaduct at Rohrbach, between Bitsch and Saargemünd, about 4 miles from the frontier, was, owing to insufficient protection, destroyed by a force of 30 German lancers. The destruction severed the communication between the two wings of the French force in Lower Alsace and Northern Lorraine.

Another instance may be cited here of the evils due to want of forethought and initiative. The railway bridge over the Sereth between Braila and Galatz was left undestroyed by the Turks during the first days of the Russo-Turkish War of 1878–9. Had it been destroyed the Russian strategical concentration would have been delayed by several weeks.

Protection of advanced depôt.

Again, the protection of the advanced depôt station on a line of communications must be carefully carried out, as such a station becomes the receptacle for all the stores upon which the life of the army depends. The same principles apply here as those already detailed for the safety of a terminal station.

And of line of communications.

The line of railway to the rear—the line of communications—would be protected as already described (Chapter III). That is to say, by works and by troops, if the enemy is skilful and energetic, taking care not to weaken the force by too great scattering. The most important points must be guarded in strength with works, detachments and cavalry patrols; while the rest of the line must be carefully patrolled and watched. The various watchposts should be in telegraphic communication with the rest of the line, so that if the enemy approaches some part weakly guarded, the reserves held in readiness at certain points may proceed at once on foot or in trains according to the emergency.

An active defence desirable.

In these proceedings we must not limit ourselves to the mere passive defence of the line, but boldly take the offensive against the enemy.

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Attack upon Railways.

The object of gaining possession of a railway by an attack upon it or, sometimes, upon the troops posted for its defence, may be either to utilise it for our own operations or to deny it to the enemy.

Object may be: (1) To gain for own use, or (2) To deny to enemy.

The points of attack may be important stations, especially at junctions, or bridges, viaducts, tunnels, &c., or open parts of the line, according to the nature of the operations contemplated.

Points of attack.

As an illustration of the first object, let us assume that the enemy having decided on a retrograde movement, it is our object to gain possession of the line as far as possible intact, and before the rolling stock has been removed. Swiftness and secresy must evidently be our aim. The enemy is in retreat, and at the last moment will presumably endeavour to destroy the more important works and the railway stations. This we must prevent by anticipating him and seizing these points. Weak detachments of cavalry are useless for this purpose. Stronger bodies of this arm with horse artillery are required in ordinary circumstances of ground; in intersected ground they should be supported by infantry, carried for speed in carts. A detachment of engineers and some railway troops may also be added. This force should be able to hold its own until support arrives. Concurrently with it, a detachment might be sent to interrupt the line in rear, in order to prevent rolling stock being sent away, and to watch and prevent the arrival of reinforcements. The choice of the different points of attack must not be left to the commander of the force, but must be determined by the General-in-Chief, in accordance with the operations.

Procedure when required for own use.

For the second object, when the attack is made with a view of depriving the enemy of a line of rail, or of interrupting his line of communications, the operation is one of the most hazardous that can be committed to cavalry, this arm being alone able to make the wide detour necessary round the flanks of the enemy, and to escape rapidly if detected. Let us assume that the enemy is carrying out his strategical concentration at the outset of the campaign. He will be on the alert; the main points will be carefully guarded. In this case everything must be done to elude observation; small patrols of cavalry, carefully led, avoiding

Procedure to prevent enemy using it.

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the main roads, and independent of the country for supplies, will offer the best chance of success. Removing rails, perhaps blowing up a bridge, tapping and afterwards cutting the telegraph wires, are the most that can ordinarily be attempted. In the event of the country being intersected, and the raiding party having defiles to pass, it will be well to leave supports at the successive defiles. Neglect of this precaution has often led to disaster.

The arm most employed upon these raids, speaking generally, is cavalry, in bodies from a patrol to a regiment or more; sometimes a mixed force of all arms. Seldom can infantry be employed alone, and then only when the ground is very unfavourable for cavalry. Engineers, railway troops, and telegraphists are sometimes attached when necessary.

Destruction of Railways.

This operation, when confined to the permanent way, is a very simple one. But if the object be to render the line useless for a long period, and make restoration difficult, the destruction of the rails will not be sufficient. We must go further, and destroy signals, water-tanks and cranes, remove, burn, or wreck the rolling stock, set fire to the stations, stores, &c., and in the last extremity blow up tunnels, cuttings, viaducts, and bridges.

With regard to the comparatively simple process of destroying rails or permanent way, the cavalry pioneers of each regiment are provided with the necessary tools and blasting material.

Any demolition should be carefully considered.

The destruction of a line should not be attempted without express orders from the highest authority, and such orders should not be given without due thought and consideration, for fear that the turn of events may in a few hours make the line important for our own purposes. No radical destruction should be ordered unless (1) the destruction is necessary; and (2) the advantages to be gained would more than counterbalance the evils that may result; and (3) that while useful to the enemy, the line must become useless to ourselves for ulterior operations.

Tunnels, viaducts, and bridges, being expensive constructions, should never be ordered for demolition except in very urgent circumstances. Even then they should

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only be destroyed, as a rule, to the extent absolutely necessary to stop traffic.

The following are the different means of rendering railways unserviceable for the enemy:—

Embankments. Embankments—by erecting barricades across them, or by making a transverse cut through them. The former is ineffectual. For the cut to produce an effective block, it ought to be 10 or 12 feet deep, 30 feet long, and 24 feet wide; an amount of work which would give employment to 56 men for 8 to 10 hours in average soil.

Cuttings. Cuttings may have barriers formed across them, or may be filled up. Barriers present but a slight obstacle. Cuttings may be best filled by blowing in the sides at the deepest parts. They should be filled up for a length of 30 to 40 feet, and to a height of 4 to 6 feet.

Tunnels. Tunnels may be either barricaded or blown in. For barricading take up the rails, form them into a barrier, and then jam in a train of loaded trucks. If further block is required, blow in both the ends of the tunnel.

Bridges. Bridges may be rendered useless by the entire or partial removal of the several portions of the construction, by burning or blowing them up. The destruction may be done by lighting inflammable materials, such as straw, brushwood, pitch, tar, petroleum, &c., on the woodwork of a wooden, or at the parts where the strain comes in an iron, bridge. Stone bridges must be destroyed by blasting.

Permanent way. Destruction of permanent way.—The material (especially at curves) may either be torn up and rendered useless on the spot, or taken up and carried away. If but little time and labour are available, make a fire of sleepers and twist the rails when hot over the fire. Destroy also the chairs with sledge hammers.

Station buildings and signals. Station buildings and signals.—The time and labour expended in demolishing the station buildings might probably be better employed in some other way. Hence, as a principle, buildings should only be demolished or blown up when by so doing other military advantages are gained in addition to the mere interruption of the railway traffic. The fuel and reserve plant should be taken away if possible; if not, it should be destroyed or rendered useless. The simplest means of depriving the adversary of the use of a station in a short time consists in the entire removal of the permanent way. In large

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stations, however, it is next to impossible to take up all the rails, and it must then suffice to remove the through lines, the cross-over roads, the tongues, wing rails, and guard rails of the points.

A switch may be removed by 16 men in 10 to 15 minutes.

The rendering useless of the arrangements connected with water supply deprives an adversary of an indispensable help in the working of a line. All contrivances for feeding the tanks should therefore be demolished.

Signals.—The poles, levers, and arms of the visual signals, the shunting and stopping signals, should be removed. The wire of the electric signals should be cut and twisted, and all apparatus, batteries, &c., taken away.

Rolling stock.

Rolling stock.—The enemy may be deprived of the use of the rolling stock either by withdrawing it beyond the probable range of his operations, or by rendering the locomotives and carriages unserviceable to an extent corresponding with the object in view. Whenever possible, the former plan should be adopted.

Locomotives may be rendered useless in the following ways:—

(*a*) By screwing off and removing or breaking the injector or pump, which feeds the boiler with water.

(*b*) By carrying away the steam dome.

(*c*) By removing the connecting rods on each side of the engine.

(*d*) By removing the piston.

(*e*) By removing the safety-valve.

A cannon shot fired into the boiler, or a charge of gun-cotton exploded, would effectually disable the engine.

To destroy trucks and carriages when there are many, the best way is to wreck them over an embankment.

Construction of Railways.

Construction and repair of railways.

The work of construction and repair of railways falls within the province of the engineer rather than the Staff Officer.

Crimea and Abyssinia.

The English were the first to construct railways in war. In the Crimea, a line 4 miles long was laid down between Balaclava and the camp. In Abyssinia, a line 11 miles in length, and another mile of sidings, was completed in four months. The ruling gradient was 1 in 60. There

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were several bridges, the longest being 72 feet. The earthworks were comparatively slight. The gauge was 5′ 6″.

In the American War of Secession the Field Railway Corps was very active in repairing permanent way, restoring bridges, and so forth. America.

In the Franco-German War, 1870–71, the Germans, being unable to capture the fortress of Metz, constructed a line to avoid this fortress, from Remilly to Pont-à-Mousson, 23¼ miles in length. The levelling and surveying commenced on the 24th August, and it was finished by the end of September—4,250 workmen, of whom about 3,000 were civilians, being employed. Two rivers, the Seille and Moselle, were bridged, and other bridges and viaducts constructed—all of wood. Ruling gradient 1 in 40. France, 1870–71.

In the Russo-Turkish War, 1877–78, a single line of railway (189 miles) was constructed from the Bender Station, on the Kisheneff-Odessa line, to Galatz. In all, 204 bridges (7,696 feet) were constructed, the largest being over the Pruth near Galatz. It was built by contract in 100 days from the date of the order, but actually in 58 working days. Gauge 5′. Flat-footed rails. Ruling gradient 1 in 55. Other minor sections of railways were also constructed. Russo-Turkish War, 1877–78.

In the Afghan campaign a line was constructed from the Indus to Sibi, 133 miles, in 103 days. Broad gauge (5′ 6″). Afghanistan.

In the Egyptian campaign a hastily improvised Military Railway Corps was employed for the first time as a British unit for war purposes. It repaired and worked the existing line of railway from Ismailia to the front, and in spite of great difficulties rendered excellent service. The constitution of the railway corps and some of the work done have been already mentioned. Egypt, 1882.

Reconnaissance of a Railway.

A reconnaissance of a railway for military purposes may be required in peace or in war, and may have reference to our own or to the enemy's lines. For instance, a special examination may be necessary before coming to a decision —(1) As to its capability for the transport of troops; (2) As to the means and best place for its destruction or restoration; (3) As to the nature of the neighbouring ground for military purposes; and (4) As to its capability

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for the march of troops. Let us consider these in the order mentioned.

(1) *Capability for the Transport of Troops.*

The points to be noted are—

The length of the line. Whether single or double. The sequence of stations, and their distances apart.

The ruling gradient and sharpest curve. Breaks of gauge.

Section of the line. Working condition of the line. Telegraph. Signals.

Locomotive depôts. Watering stations for locomotives. Capacity of tanks, &c.

Descriptions of the station buildings; number, dimensions, and suitability of platforms, points, sidings, docks, turn-tables, loading arrangements, *e.g.*, cranes, &c., noting if they are steam, hydraulic, or worked by hand.

Reserve stock of rails, sleepers, &c., and whether additional sidings can be formed.

What stations are suited as depôt stations on the line of communications, *e.g.*, for sheltering troops, feeding the troops in transit, or for forming magazines or hospitals.

In what way the stations at junctions or at the terminal points should be occupied and defended.

The amount of rolling stock available, and its capacity for troops, horses, &c. The number and power of the engines. The amount of fuel, reserve stores. Workshops. Railway staff.

(2) *Destruction and Restoration.*

Nature of the permanent way. Gauge and kind of rail employed. Single or double.

Size of stations, and their suitability for storing large masses of rolling stock.

What are the most suitable objects for destruction, and the quickest mode of destroying them? For this we require to know—

In the case of *embankments*—length, breadth, height, constitution, slopes, arches, and culverts.

In *cuttings*—length, breadth at bottom, depth, slopes, nature of soil, side drains, &c.

On *hill-sides*—length of these lines, height and slope of hill-side up and down, nature of retaining slope, &c.

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In *tunnels*—length, height, breadth, the surrounding soil, ventilating shafts.

The *bridges and viaducts*—length, material, and construction.

Where material, carts, and labour can be requisitioned.

(3) *Neighbouring Ground for Military Purposes.*

Fortresses, positions, important passages of rivers or mountain defiles. Places where the traffic might be stopped.

The suitability of the stations for occupation and defence. Approaches to stations. Direction of neighbouring roads.

Where the railway is on the natural level of the ground, where it enters cuttings or tunnels, or crosses by a viaduct or embankment.

Where the line is intersected by other communications on the same level.

(4) *Suitability for March of Troops.*

Nature of the permanent way. Breadth. Whether room for wagons alongside the rails, or whether one wheel must be between the rails.

Whether the sleepers are longitudinal or transverse; whether, in the latter case, the intermediate spaces are filled up. Single or double line.

Whether the railway has for its whole length roads alongside suitable for cavalry and artillery, or are there roads at any rate alongside the line at those parts which are unfit for horses and wagons?

As a general rule, infantry can always use the railway for marching; cavalry only on a narrow front and at a distance from the enemy. For wagons railways are only possible for short distances, and never when near the enemy.

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CHAPTER IX.—DUTIES OF STAFF IN CONNECTION WITH SUPPLY.

Introductory Observations.

Success in supply lies in choice of head of department, and perfect accord between him and Combatant Staff.

The supply of an army in the field is the most difficult of all administrative questions. For its success not only must the head of the Commissariat Department in the field be an officer of great energy, business habits and resource, but there must be the most perfect understanding between him and the Combatant Staff, so that all may be working in harmony for the common end. Just as it is the duty of the Combatant Staff of a commander by well-planned movements to bring a superiority of force to bear at the decisive point, so it is the province of his Administrative Staff to provide the supplies, by virtue of which man and horse enter into the struggle with the vigour necessary for the sustained effort which is then required of them.

Hence, too much stress cannot be laid on the importance of thorough co-operation between Staff and Commissariat, a hand-in-hand working of those entrusted with the leading and the administration.

Absence of this accord led to failure in 1870–71.

The absence of this joint work was apparent in the French army in 1870–71. The commanders made their dispositions, communicated these dispositions to the Intendance and left to the latter the task of providing for the supply as best they could. That close interchange of view between the general and his administrative staff, so essential to success, was lacking.

It is not here intended to convey that, while giving the question of supply its due weight, the General should necessarily take the opinion of the Commissary General when forming his plans. Unquestionably not, for the supply must be subordinated to the plans. But what is meant is that when the plans are made by which the object of the moment is to be attained, the General cannot enter too closely into the supply question with his Administrative Staff Officer.

Head of department must have

The latter must then work out the details connected with his Department, imparting to his arrangements such

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elasticity that they not only fall in with the formulated plans of the General, but bend to them in the event of their undergoing modifications (within certain limits) necessitated by the ever-changing circumstances of war. In this will be shown his intelligence, prevision, and resource. Should the circumstances change, he must be the first to grapple with and overcome the new difficulties. The maxim he should always have in view is to make apparent impossibilities possible. To render his task light, he must have the full confidence of the General, and must be supported in every way by the Combatant Staff of the Field Force and by the General of Communications and his staff.

full support of the General.

General Conditions affecting Supply.

The supply of an army in time of war is dependent upon a number of conditions and circumstances, more or less complex and varied. For instance, the supply is affected by the resources of the theatre of war and the facilities for utilizing these resources; by the time of year and the climate; by the nature of the war, whether offensive or defensive; by the length of the line of communications; by the rapidity of the movements; by the propinquity of the enemy and by the temper of the inhabitants.

Supply is dependent on complex and varied conditions.

The resources of all countries which may possibly become theatres of war should be studied beforehand in peace, and the results worked up in a form for reference, a duty which devolves upon the Intelligence Branch of our Head Quarters Staff. Countries which are mainly agricultural offer, as a rule, the greatest facilities from a supply point of view; here the army can live longest on the local resources, while at the same time its operations are least hampered by supply considerations. In manufacturing districts it is more easy to find money than supplies; while, in a cattle-breeding country, bread-stuffs will not probably be found in excess of the local requirements, but meat, forage, and transport will be ensured.

Resources of all theatres of war should be studied in peace.

Nature of country affects supply.

The facilities for utilising the resources will depend mainly on the state of the communications. An army may suffer from want in the richest country, if the means of communication be in an unsatisfactory condition. However vast the accumulated stores may be, they are of no use if they cannot be conveyed after the army to

Facilities for utilising resources of a theatre of war depend chiefly on communications.

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the place where they have to be consumed.* Hence, in nearly all the campaigns in which the British army is engaged, one of the first thoughts of the commander is to place the roads within the area of military operations in good order, and, if possible, to construct or to bring into working condition a line of rail or tramway, so as to lessen the difficulties of conveying supplies to the front.

Time of year and climate influence supply.

The influence of the time of year and the climate upon the yield of supplies and upon the state of the communications is too obvious to require comment.

Character of war also influences.

The character of the war, offensive or defensive, and the length of the line of operations affect the supply service. Generally speaking, it is easier to arrange the supply service when acting on the defensive in one's own country than when carrying the war into the enemy's land. The defender can organise a regular communication with his depôts and magazines, and can cause the local supplies, which he does not require, to be destroyed or removed from the assailant's reach. The assailant, on the other hand, is gradually receding from his base; transport becomes more difficult as he advances; he is thrown on the resources of a more or less exhausted theatre of war, and if these be insufficient and the roads bad, he may be placed in a very critical position.

Disadvantageous influence of long line of operations.

Much lessened by railroads.

The disadvantages of a long line of operations are much lessened by the presence of a railroad. As a means of facilitating supply and bridging over long distances railways are invaluable.

Rapidity of movements affects supply.

Supply is furthermore influenced by the degree of rapidity of movement of the troops. It is plain that if troops remain stationary, supply from the rear is facilitated, particularly if the communications be good. But if the troops be living on the resources of the country, a prolonged sojourn at one and the same spot exhausts the local resources, so that sooner or later, according to the abundance, the supplies must come from the rear. On the other hand, if the troops are on the move, the

* Lord Wellington writing to the English Ambassador at Lisbon, from Celorico, on 30th March, 1811, says:—"To find food for an army is but half the difficulty. We have plenty of provisions in our depôts at Villa Franca, Figueira, Tojal, and Lisbon; but these provisions are of no use to the troops in the field, if there is no transport to bring them to the troops who are to consume them."

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extent to which the local resources can be utilised will depend on the breadth of the strategic front on which they are moving, and the rate of their movement. The broader the front, the easier the supply, and *vice versâ*. Hence the well-known saying — "Fight concentrated, march separated."

Breadth of strategic front influences.

Clausewitz estimates that in an average country of Western Europe, a force of 100,000 to 150,000 men, marching on a tolerably broad front, can be subsisted from local sources so long as they are in movement. Jomini's calculation is about the same. But so soon as the force halts or concentrates for battle, or retires over the same ground, it becomes dependent on its magazines for supply.

Capability of Western Europe to subsist armies.

The more concentrated the troops and the more rapidly they move, the more difficult the supply, and *vice versâ*. Large masses moving concentrated and rapidly can scarcely ever live at the expense of the country, however rich it may be, as there is no possibility of collecting the supplies in time and delivering them to the troops. In such circumstances only the cavalry, and in some cases the advanced guards, can hope to make use of the resources of the locality through which the line of operations passes; the bulk of the troops must be fed from the rear.

Large bodies moving rapidly difficult to supply.

For the same reasons the propinquity of the enemy exercises influence on the supply, as his presence compels the adversary to be quartered and to march concentrated, preventing the resources of the country being utilised, and impeding the bringing up of supplies; moreover, as the enemy is approached, the number of unforeseen incidents increases, rendering supply difficult and sometimes upsetting all arrangements.

Propinquity of enemy affects supply.

Lastly, supply, generally, and more particularly the utilisation of the resources of the country, depend to a great extent on the temper of the local inhabitants. If they be not unfavourably disposed, supply is facilitated; if passive, the task of turning the local resources to account depends entirely upon moderation and tact in not exasperating the people by excessive and unreasonable demands. Ready money becomes a golden key on these occasions. But if the inhabitants be hostile to the troops, the task of supply becomes most difficult, particularly so when the population does not limit itself merely to concealing

Supply also dependent on attitude of inhabitants.

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supplies, but takes an active part in the military operations. In this event it is impossible to calculate either upon the local resources or the certainty of an uninterrupted transport of supplies from the rear.

Real difficulty is to adjust supply to strategy.

From what has preceded it is plain that the real difficulty is to adjust the supply service to the strategical requirements: elements which are, as a rule, antagonistic. Thus, for example, the more the forces are concentrated, the more advantageous on strategical and tactical grounds, but the more unfavourable as regards supply, which demands as large a dispersion as possible. Moreover, the circumstances of war change constantly and unexpectedly, and it becomes a matter of great difficulty to change the direction of supplies once set in movement.

Supplies carried with an Army.

Supplies are derived from own resources and from theatre of war.

An army in the field is supplied, generally speaking, partly from its own resources and partly from those of the theatre of war. Countries so barren as to be destitute of any resources are exceptional, but they do occur, as, for instance, in Africa, and on the Indian frontier.

Live on country as much as possible.

The right of nations levying war to obtain what they can from the country itself is a very old one, and has been exercised from the earliest times. Experience, however, shows that, whether the war be offensive or defensive, supplies will be more readily and abundantly obtained when paid for in cash than when taken by force.

Advantages derived from payment for supplies.

For instance, during the war in France in the early part of this century, Wellington's army, owing to the observance of this principle, was well supplied; while the French, although operating in their own country, were in the direst straits. It is well, therefore, to consider it a principle (1) that, if necessity requires the collection of supplies in an invaded country, the taking of those supplies should be made as little distasteful as possible, viz., by payment in cash at a fair market rate, and (2) that force should only be used as a last resource when persuasion has failed.

Train supplies to be regarded generally as a reserve.

In the rich, well-populated districts of Europe an army, unless it remains concentrated and stationary for some time together, or has to pass through a district previously exhausted, can be supported to a considerable extent from the resources of the theatre of war. The supplies con-

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veyed by the train in its wake are then regarded in the light of a reserve, which is ready to be drawn upon when the country fails. In barren districts inhabited by uncivilised peoples, however, the supplies accompanying the army become the sole means for its support.

Supplies accompanying army divided into (1) field reserves, (2) stationary reserves.

The supplies accompanying an army may be classed in two categories—(1) those conveyed with the troops: movable or field reserves; and (2) stationary reserves.

The movable or field reserves, again, consist of (*a*) valise reserve; (*b*) regimental* and departmental reserve;† and (*c*) field magazines;‡ while the stationary reserves comprise the magazines or depôts formed at the base and in the theatre of war.

(1) *Movable or Field Reserves.*

Movable or Field Reserves.

The object of the movable reserves is to guarantee to the troops a sure supply during the operations, should the theatre of war fail; but these reserves must be limited to the requirements of absolute necessity, otherwise the length of the train would be unduly extended and the operations thereby hampered.

The amount of the valise reserve, and of the regimental and departmental reserve is definitely laid down in all armies; but the extent of the reserve to be carried in the field magazines cannot be fixed, as it will naturally vary with the resources of the theatre of war, the nature of the communications, the distance of the enemy, and so forth. As the object of this reserve is to replace the expended supplies of the other movable reserves, it is evident that the more freely the latter can draw upon the resources of the country, or from stationary depôts, the smaller need be the field magazine. If the troops are in direct communication by rail or water route with their base, the size of the field magazine may be reduced to a minimum, and under favourable circumstances it may be dispensed with altogether. On the other hand, in a barren country the field magazine may grow to very large dimensions.

Hence the field magazine must be determined for every

* One day's carried in regimental Transport. See "Transport" p. 189.

† One day's in the Brigade, and 1 day's in the Divisional Commissariat Transport. See "Transport" pp. 190-1. All the foregoing are mil tary transport: carriages, horses, and men.

‡ Advanced depôts *general transport*, procured locally.

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given case, while the valise, regimental, and departmental reserves remain the same.

These reserves are fixed as follows for the different armies of Western Europe :—

(1) Valise Reserve.

(1) The Valise Reserve in Austria is one day's "iron ration" and two days' "expense ration" (without meat), weighing 6·35 lbs; France, two days' rations; Germany, three days' "iron ration" including meat, weight 6·3 lbs. if biscuit is carried; Great Britain, two day's "iron ration" and the balance of the day's ordinary ration; Italy, two days' rations; Russia, three days' rations.

Importance of the reserve or "iron" ration.

In the German and other armies stringent regulations exist that the Valise Reserve can only be touched by special order of the Corps Commander. In spite of this, it is somewhat difficult to impress young soldiers with the importance of keeping this reserve intact against emergency; rather than be burdened with the weight, they are prone to eat the rations or throw them away. Hence, frequent inspections are necessary.

In our service it is laid down that not only the Valise but the Regimental and Departmental Reserves* are to be kept intact as long as possible.

(2) Regimental and Departmental Reserve.

(2) The Regimental and Departmental Reserve in Austria is two days in regimental and four days in departmental train, but eight days' meat (seven days live, one in carcase); France, two days in regimental, four days in departmental train; Germany, one day in regimental, four days in departmental train; Great Britain, one day in regimental, two days in departmental train; Italy, one day in regimental, and two days in departmental train; Russia, five days in regimental train.

Aggregate of the foregoing in European armies.

Hence the total of the Valise, Regimental and Departmental Reserves in the different armies will stand as follows :—

* The object in all armies of dividing this reserve between the regimental and departmental transport, is to have at least one ration close at hand. On the march in vicinity of the enemy the regimental transport is usually disposed so that it can be brought up to the troops at the end of the day, which is not the case with the departmental transport kept further in rear. By this arrangement the men do not have to wait far into the night for the arrival of the train, nor are they required to eat their "iron ration." The regimental transport usually carries a fresh meat ration, and thus the evil is avoided of the troops having to prepare and consume freshly-slaughtered meat.

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	Mens' Rations.	Oats.
Austria	9	$8\frac{1}{3}$
France	8	7
Germany ..	8	1 Cavalry 3 Artillery and Train
Great Britain ..	5 or if no tents are carried. 7	3 6
Italy	5	2
Russia	8	4

(3) The Movable or Field Magazines.—It has been already mentioned that the field magazines are intended to serve as a commissariat reserve in the event of the theatre of war furnishing little or no food supplies, and that their dimensions will vary chiefly with the abundance or otherwise of the local resources, the state of the roads, and the distance of the enemy.

(3) Movable or field magazines.

Their size will vary with each campaign.

As instances of an extreme case of unproductiveness of country, the following may be cited to show the size to which the field magazine may grow:—

(1) The movable magazines accompanying the British force of 10,000 fighting men in the Abyssinian campaign consisted of 26,000 animals and 12,000 men, partly carriers and partly drivers. Supplies were carried for the entire 40 days' march to Magdala.

(2) In the Russian expedition to Khiva in 1873 the field magazines for the force of 5,500 men operating from Tashkent consisted of 8,800 camels, carrying $2\frac{1}{2}$ months' reserve.

Taking countries rather more productive—

(3) In the older campaigns against Turkey,* the Russian force was accompanied by a one month or two months' reserve in the field magazines. For instance, in 1854 the Danube Army, under Prince Gortschakoff, 100,000 men, had with it a field magazine of 13,000 carts carrying one month's reserve.

* In the campaign of 1877–8 the commissariat carried no supplies after the army, but only to the expense magazines established with each stationary force. The Bulgarians and other Christians were looked to for furnishing supplies to the troops operating south of the Balkans. This expectation proved to be well-founded.

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(4) The column (10,000 fighting men) moving from Cabul to Candahar, under General Sir F. Roberts, in 1880, was accompanied by a field magazine, carried on 7,500 pack animals, or in the shape of live stock with the column, as follows :—

Reserves for British troops—Breadstuffs, 5 days; preserved vegetables, 15 days; groceries, 30 days; fresh meat, 10 days, with 20 per cent. spare. Reserves for native troops :—Breadstuffs, 5 days; groceries 30 days; fresh meat, 4 days, with 20 per cent. spare. Also a reserve of rum, lime juice, pea soup, and tinned meat.

Passing to civilised, well-populated countries—

(5) The German Army in the campaigns of 1866 and 1870–71 had, as a general rule, a 6 days' supply in its field magazines. The Austrian Army in 1866 had likewise a field magazine with 6 or 8 days' supply.

Consequently field magazines differ very much in their dimensions, carrying, as they do, supplies varying from 6 days to as many months.

Composition of field magazines.

Field magazines may consist of pack animals, wheeled vehicles, or carriers, according to the nature of the country in which the force is operating. Whatever the kind of carriage may be, it usually consists of transport hired or impressed in the country, and it is given a semi-military organisation; that is to say, the conductors and non-commissioned Officers acting as Superintendents are lent from the army.

Dimensions for British Army operating in Western Europe.

Hence with the army of Great Britain, where the means of transport varies with each campaign, it becomes impossible to determine even approximately the dimensions of the field magazine for colonial warfare. For campaigns in Europe it has, however, been to a certain extent determined. In this case the field magazines are represented by the advanced depôt general transport. The War Office Committee, which presented its Report in January, 1877, laid down that the advanced depôt should have sufficient transport (procured locally) with it to convey to the front not less than 4 days' * rations and forage, and, if necessary, form the nucleus of a new depôt.

Dimensions in Foreign Armies in same circumstances.

In Germany each army corps has a commissariat park of 5 columns.† Each column consists of 82 pair-horse

* This does not limit the *supplies* at the advanced depôt to this amount; the transport merely is fixed. The supplies of course, would be collected to the utmost extent possible.

† Properly speaking, of 6 columns, but the sixth column of all the army corps is separated at the outset, and is distributed for service on the line of communications.

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carts. These columns are intended to maintain the supplies of the commissariat train with the troops (*proviant colonnen*). When fully loaded the commissariat park carries either 9 days' rations or 7 days' oats for the whole army corps.

In the Austrian Army the field magazines convey a 6 days' supply of food and oats for all the men and horses of the army corps. Each magazine (*Feld-verpflegs-magazin*) is so organised that it can be divided, if necessary, into 5 sections, and is calculated to carry the supplies for a force of not more than 50,000 men and 10,000 horses.

In the Italian Army the field magazines carry 5 days' food and 10 days' forage.

In Russia the intendance department furnishes the field magazine with 580 pair-horse carts and 1,290 horses for each Division, carrying 10 days' rations for the men and 3 days' oats for the Division, besides 10 days for all the men and horses of the transport. Each magazine is capable of being broken up into 4 divisions.

(2) *Stationary Magazines or Depôts.*

STATIONARY MAGAZINES.

These include, as already mentioned, the supply depôts formed at the base, on the line of communications, and generally, in the theatre of war. During active operations, they become receptacles for all the supplies that can be gathered locally or are brought up from the rear. They should only be drawn upon by the field force when the local supplies in their immediate vicinity fall short.

Become sole source in certain circumstances, although local resources utilised to the utmost.

When large bodies of troops are concentrated in a small area or remain for a long time in one and the same place, stationary magazines become the main source of supply; as, for instance, during the strategical concentration of troops at the base or frontier, in the attack and defence of fortresses or positions, during an armistice, and so forth.

Classification of stationary magazines.

Magazines are classed in three categories: (1) main or reserve, (2) intermediate, and (3) expense.

(1) Main or reserve magazines.

Main or Reserve Magazines.—Examples of this class are the magazines established in home territory, in frontier fortresses, or at other points near which the troops carry out their strategical concentration, or where the troops effect their landing in the case of a maritime base. Their sites will depend upon the character and position of the enemy.

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These magazines will be supplied from the sea, in the case of a maritime base, or by contract or purchase in the country lying in proximity to the prospective theatre of war.

In this class the following may be instanced:—(1) The base magazines at Lisbon for Lord Wellington's operations towards Ciudad Rodrigo and Badajoz. (2) The magazines formed before the beginning of the war in 1870 at Cologne, Coblentz, Bingen, Mainz, and Worms; later on those formed in the frontier districts (Saarlouis, &c.). (3) Those formed by the Russian Army in the Bessarabian, Odessa, and Kieff military districts, before the Turkish War of 1877–8; and later on those formed in Roumania and on the left bank of the Danube. (4) The base magazine at Peshawur for the operations by the Kabul line against Afghanistan in 1879–80. (5) Pietermaritzburg for the Zulu and Transvaal operations in 1879–81. (6) Ismailia for the operations along the Sweet Water Canal towards Cairo in 1882.

(2) Intermediate magazines.

Intermediate magazines are those formed during offensive movements when an army proceeds so far from its primary base that it would waste time and transport by drawing directly from the base. These intermediate magazines may be filled from the primary base, but the most convenient way, at least at the outset, is to sweep in supplies from the neighbouring district. In a country destitute of resources, such as the Crimea, Abyssinia, Ashantee, &c., they would of necessity be filled direct from the base. Sometimes the newly-erected intermediate magazine is called the advanced base magazine.

As an instance of intermediate magazines may be mentioned:—(1) In the operations of Lord Wellington, before alluded to, the magazines formed at Ciudad Rodrigo and Badajoz for the further operations against Salamanca and Madrid. (2) In the war of 1870–71, during the operations preceding the investment of Metz, the magazines formed at Courcelles for the 1st Army, at Remilly for the 2nd Army, and at Nancy-Luneville for the 3rd Army.

(3) Expense magazines.

Expense magazines are intended for the current supply of the troops, and hence are established at any time before or during the war according as they may be required, and in the vicinity of the troops. They have a temporary character, existing for a few days, sometimes for only one day.

The advanced depôt an expense magazine.

Expense magazines include of course the *etappen haupt ort* of the German system, or the advanced depôt of the British system, and the commissariat depôts on the line of communications.

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This advanced depôt* is always pushed forward to the furthest point in rear of the field army consistent with safety. From its magazines, supplies are conveyed to the army by every possible means. If the army is close, the departmental transport with the troops works back to the advanced depôt, conveying the supplies to the Divisional Depôts. Between the Divisional Depôts and the troops work the brigade and regimental transport. If, however, the troops recede from the advanced depôt so far that the departmental transport cannot conveniently draw from the advanced depôt, but not far enough to require a transfer forward of the advanced depôt, the latter would utilise its transport to move supplies to some intermediate rendezvous which the departmental transport could reach.

Relation between advanced depôts and divisional depôts.

An advanced depôt magazine, after ceasing to be such on the transfer forward of the advanced depôt, becomes an expense magazine for passing detachments.

Examples of expense magazines :—(1) In the Afghan War, 1879–80, the depôts at Lundi Kotal, Jellalabad, and Safed Sung on the Khyber line; the depôts at Kuram on the Kuram line; and the depôts at Sibi, Mach, Quetta, and Chaman on the Kandahar line. (2) In the operations in Natal, 1881, Newcastle was the advanced depôt of the field force, while Ladysmith formed an expense magazine on the line of communications.

From what has preceded it will be evident that the stationary magazines will vary in their organisation according to the purposes which they have to serve. The selection of their sites, their number, size, the amount of supplies to be accumulated in them, the time of opening, the means for their replenishment will depend on the *rôle* each has to play, whether reserve, intermediate, or expense.

Number and sites of stationary magazines vary with circumstances.

Measures for the Supply of Troops in War.

This subject may be conveniently considered under two aspects, (1) up to the commencement of operations, and (2) during the operations.

* The advanced depôt is more than a mere food depôt. It holds reserves of ordnance stores, hospitals, &c., &c. It is also the head quarters of the bakery train, which on arrival sets actively to work in order to supplement the field ovens with the troops.

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Supply prior to the Commencement of Operations.

(1) Supply before taking the field.

In preparing the supplies for a campaign, the following points have to be considered—(1) The probable daily consumption of supplies, and the number of days' reserve to be accumulated. (2) Where and by what date they must be ready. (3) Whence are the supplies to be obtained, and how are they to be conveyed to their destination. (4) How are the expended supplies to be replenished. (5) Where and when should the movable magazines be organised.

Accumulation of supplies.

Food necessities for an army.

1. *Amount of Supplies and Reserves necessary.*—The food necessities for man and horse daily may be taken at 3½ lbs. gross per man* and 10 lbs. of oats. This does not include hay or compressed forage, where there is no grass available in the theatre of war (parts of Afghanistan and South Africa.) The 3½ lbs. is the gross weight of a man's ration, when it consists of fresh meat; rather less, when it consists of preserved meat.† 3 lbs. wood also must be

* In the Afghan Campaign, 1878–80, the ration for British troops consisted of the following:—Fresh meat (excluding bone), 1 lb.; bread, 1¼ lb. (or biscuit, 1 lb.); rice or flour, 4 oz.; sugar, 3 oz.; tea, ¼ oz.; salt, ¾ oz.; potatoes, 10 oz.; green vegetables, when procurable, 6 oz. (if not procurable, 1 oz. dhall and 2 oz. extra potatoes issued). Net weight, 3½ to 3¾ lbs. For natives:—Atta or rice, 1 seer; dhall, 2 chittacks; ghee, ½ chittack; salt, ½ chittack—in all 2 lbs. 6 oz. Salt pork was not liked. Australian meat, Edward's desiccated soup, and Kopf's peas sausage approved. Pickles, preserved vegetables (when no fresh available), cocoa, lime juice (½ oz., in lieu of fresh vegetables); condensed milk considered valuable; tobacco also recommended; coffee not recommended owing to difficulty of preparation.

In the Egyptian Expedition, 1882, the ration for British troops consisted of 1 lb. fresh meat (or 1¼ if ordered by General Officer Commanding), or 1 lb. preserved meat; 1¼ lb. bread or 1 lb. biscuit; ½ oz. tea; ½ oz. coffee; 2½ oz. sugar; ½ oz. salt; $\frac{1}{16}$ oz. pepper; ⅓ lb. fresh vegetables when procurable, or if not, 2 oz. compressed; ½ oz. lime juice; ½ gill rum. Net weight, 3 to 3¼ lbs. Add 4 oz. for package, candles, &c., and the gross weight of the ration will amount to 3½ lbs.

† There used to be great aversion to preserved meat in the British army, but this is gradually disappearing, in consequence of improved manufacture and palatability. A ration of cooked meat carried in a man's haversack during a long dusty march on a hot day would not be nearly so palatable as a ration of tinned meat. The cattle driven after an army also lose greatly in condition, and if killed and eaten at the end of the day's march the meat is very tough. Again, in wet weather or in a high wind it is very difficult

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allowed per man for cooking, if there is no dry fuel available in the theatre of war. From this can be calculated the weight and bulk of the rations for the entire field force. The amount of reserves depends in each case upon the conditions, already mentioned, which influence supply.

Amount of reserve to be held varies with each campaign.

For operations in a rich, well-populated country a month's reserve, exclusive of the supplies required in the first instance to complete the field reserves with the troops, or say 1½ to 2 months in all, would probably suffice. Where the theatre of war is thinly populated the foregoing amount of reserve may be doubled, and for a war in a desert country, trebled. In Afghanistan, 1879-80, the reserve was usually 6 months. In Egypt 1882 the reserve was 2 months.

For the garrisons of fortresses, it is usual to store a 6 months' supply, as the civil population may also require food.

Reserve for fortresses.

2. *Where and by what date the Supplies should be accumulated.*—The place of accumulation will depend on the point selected for the strategical concentration, while it must at the same time be removed beyond range of the enemy's possible incursions and be within easy access of the army. Fortified points on railways, or other main arteries of communication are convenient sites for the main reserves. In the case of considerable bodies of troops, distinct magazines for the higher units are necessary, in order that the loading up of the field reserves may proceed quickly. The foregoing remarks apply to the main and intermediate magazines. The number of depôts on the line of communications depends on its length, as they will have to be distributed at intervals along the road for the supply of passing detachments and of the troops guarding the line. The quantity of supplies for each, including a

Supplies accumulated at place of strategical concentration, then in

Depôts on line of communication.

to cook. Preserved provisions, when well prepared, are an excellent substitute, take little room, and the ration only weighs about ¾ of the fresh meat ration. There are times when it becomes impossible to feed the men with fresh meat, viz., immediately after landing and moving to the front, when large bodies are concentrated, when the communications are commanded by forts, and so forth. A few days' preserved rations make the men quite independent. The great difficulty with preserved meats in tins is that if the tins get damaged in transit and the air gets in, they at once spoil. Good packing tends to prevent this.

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necessary reserve, should be calculated accordingly. Other expense magazines in the theatre of war would be limited to the necessities of a speedy delivery to the troops, and would only contain the amount of supplies actually required. Any excess is difficult to remove when the *rôle* of the magazine has ceased.

Site for advanced depôts to be selected.

The sites of advanced depôts should be chosen so as to favour rapid replenishment and delivery. There should be plenty of open space, large roomy buildings, place for cattle depôt, bakeries, workshops, &c., with good communication to neighbouring district, so as to favour the collection of local supplies. The amount of supplies to be maintained is guided by the same considerations as those mentioned above for main magazines.

As regards the date by which the supplies should be accumulated at the base, it is evident that, as the troops will commence to consume directly their strategical concentration begins, the supplies, or at any rate part of them, should be in readiness beforehand.

Whence supplies are accumulated.

3. *Whence are the Supplies to be obtained and how forwarded.*—In the expeditions of the British Army, when the troops embark from this country, the supplies usually

For British expeditions usually carried across sea.

accompany or slightly precede the troops. It will be often necessary to purchase mules and other transport animals in foreign countries, and ship them for the intended base of operations. Statistics of transport-producing countries should be prepared in time of peace, and agents sent to make purchases directly war is contemplated. In the case of operations from a distant base in a friendly country, say a colony, preparations for the accumulation of supplies would be made beforehand in that colony, the telegraph often anticipating the arrival of the troops by several weeks. If the place of disembarkation is not in our hands, the provision ships would be timed to arrive with the force, and the supplies landed directly the latter has made good its footing.

Provision storeships for base.

As there is always more or less confusion on first landing, and some time may elapse before the commissariat is in working order, it is the practice to ship in each transport 14 days' supply of everything, including fuel, for all the men and horses on board; and it is further proposed to send out provision store ships, laden with food and a proportion of medical comforts, arranged so as to be readily

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accessible. These store ships serve as the base magazine in the first instance.

By railroad for foreign armies.

But on the Continent of Europe, when armies are concentrating on the frontier, the chief means of transport for troops and stores is by rail. When the transport is by rail, we must know the number of lines available, and the amount and capacity of the rolling stock; and in the case of a change of gauge or breaks in the communication, the number of transfers that have to be made. Knowing the number of provision trains that can be despatched daily, the number of wagons to each train, and the capacity of each wagon, we can calculate the amount of stores that can be transported daily to the depôts at the base. Railroads, as a rule, are only available for supplies prior to the movement of concentration of the troops. During the concentration, the lines are fully taken up by the troops. In the campaign of 1870–71 the contractors for supplying the troops concentrating on the frontier were denied the use of the railways, and had to manage as they could by purchases in the frontier districts. The supply, in consequence of the poverty of the district, was defective.

In the concentration of the Russian army in Roumania in the campaign of 1877–78 the bulk of the troops marched, and only a small part were despatched by rail. One supply train, and that not every day, was all that could be allowed. The railway is the worst in Europe, and only admitted of five trains daily.

Use of railroads can only be counted upon to limited extent.

It may be taken as a principle that prior to the concentration of the troops only a limited number of supply trains can be despatched daily, as the ordinary passenger and other traffic cannot be stopped; during the strategical concentration of the troops no supply trains at all; after the strategical concentration all the trains and all the rolling stock will be available.

Replenishing supplies from stationary magazines.

4. *Replenishing Supplies.*—Each unit must know from what magazine its supplies have to be drawn. This should be so arranged that the supply wagons do not cross each other on their way to and from the magazines, as blocks of any kind in rear of the army are very undesirable, and may be serious in their consequences. Light serviceable carts and easily-stowed preserved provisions are the best means to avoid breakdowns and loss of time.

Organisation of field

5. *Time and place of organisation of the Movable Magazines.*

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magazines from local transport.

—These can be most conveniently formed in the district of concentration, and near the main magazine whence they have to be filled. The collection is usually made through the local civil authorities, and the transport should be completed and organised into units by the time the field army arrives, so as to be able to follow it at a distance of one or two days' march. It is rarely the case that local transport cannot be obtained. No country grows corn or breadstuffs or raises cattle beyond the requirements of its inhabitants without being possessed of the means of conveyance to profitable markets elsewhere. The local transport, as well as the produce of the soil above the local requirements, would be at the disposal of the commissariat for the organisation (1) of the field magazines, and (2) of the transport on the line of communications.

Supply during Military Operations.

(2) Supply during military operations.

When the troops move from their base the difficulties of supply commence in earnest, and any means which guarantees the necessary supplies should be employed, by pushing forward magazines from the rear:—by local purchases, by requisitions, and by every expedient which the ingenuity of the commissariat can suggest.

As a rule, twice the quantity actually required should be stored as a margin against waste, loss, and unforeseen eventualities.

The general principle of our system is to obtain as much as possible locally, and to supplement the deficiencies by convoys from the base.

Furthermore, during the march the food reserves carried with the troops should be kept intact, as they will probably be the only means of supply before and after an engagement.

Organisation of supplies on line of communication.

Simultaneously with the forward movement from the base the line of communications is organised; that is to say, depôts are formed at each halting place. To each of these depôts is assigned a certain district, and in each of these districts commences a systematic collection of provisions. On the rapidity with which these depôts are formed and filled, and generally on the completeness of the organisation of the line of communications, will depend to a great extent the punctual renewal of the expended field reserves of the army. The collection of local sup-

Supply on line of march.

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plies should theoretically commence the moment the advanced guard has passed the spot which is appointed as the halting-place that night for the main body; then, under favourable conditions, by paying liberally, sufficient supplies can be sometimes collected before night to replace what is expended during the day. It is very commonly the practice for certain parts of the Cavalry Division sent in advance of the army to be deputed to collect supplies, the villages within its line of march being told off to different requisitioning parties. In this way, as the Cavalry Division precedes the army by one or two days, the collection of supplies can be made before the advanced guards of the columns arrive. The Cavalry Division must have commissariat officials, interpreters, and money with it for this purpose.

Cavalry division can do much in collecting supplies for columns in rear.

The depôts so created on the line become expense magazines, from which the field magazines can be completed or from which the troops can draw directly.

The cavalry in advance of the army and the advanced guards of the columns should, if possible, be fed from local supplies or by the householders on whom they are billeted. Particularly is this necessary for the cavalry, as its movements become cramped when hampered with a supply train.

Cavalry division, and if possible advanced guards, should live on country.

On the day of an engagement the troops have generally to draw on their valise reserves, as the train purposely left in rear cannot always come up to the battle-field that night if a victory is gained; while in the event of a retreat it will be already on its march to the rear, and there will be still less likelihood of the troops being able to draw upon it. This same day, however, should not be an idle one for the commissariat, and should be utilised by the regimental and departmental train in filling up its supplies from the movable reserves. It is the halting and fighting days that the commissariat must utilise for bringing up supplies and replacing what has been expended.

Supply on day of battle.

After the engagement, the mode of supply will naturally depend on the result.

If the enemy is defeated and the army pursues, it may advance on a broader front than before the collision. This accelerates the movement and facilitates supply; as the broader the front, the less the number of men, and the

Supply after engagement.

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During pursuit.

depth of each column, the more easy to utilise the local resources, and the more quickly can the regimental and departmental train and the field magazines be brought up. The local resources cannot be counted upon to a great extent, as the enemy in all probability will have exhausted the district; while the army moving in pursuit will be marching more rapidly than supplies can be collected; so that the troops will be almost entirely cast on the resources of their field reserves. Hence the assailant after a time will have to halt for the arrival of supplies. Every hour then lost is a gain to the enemy. This is the critical time for the commissariat, and the celerity shown in bringing up supplies from the rear will be the criterion of the efficiency and foresight of the department.

During retreat.

On the other hand, if a retreat becomes necessary, the whole train will have been sent to the rear well in advance of the retreating columns. Hence the troops will be unable to draw on them, and the only source of supply left is the reserve in the depôts on the line of communications. From this it is evident of what importance it becomes that the depôts on the line of communications should be organised immediately after the army has passed through in its advance, not only for supplying it while taking the offensive, but as a measure of precaution against ill-success. If there is in readiness at each depôt a one-day's reserve for the army, the latter may be considered safe in the event of a reverse.

It is needless to observe that all supplies in excess, after provision for the rearguard, should be destroyed. The destruction of these supplies devolves upon the main body, as the rearguard is amply occupied with warding off the attacks of the enemy.

Supply by billeting troops on inhabitants.

There is another means of supply to which recourse may be had in favourable circumstances, namely, by quartering on the inhabitants. This is, however, only feasible when in a well-populated country and beyond striking distance of the enemy. The essence of this mode of supply consists in the troops receiving food in kind from the inhabitants in their billets: a fixed quantity for a definite rate of remuneration. The nature of the meal and the scale of payment are fixed by the military authorities and communicated to the public through the

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local authorities. The Germans used this means of supply largely in France in 1870–71. Vigilance must be exercised that the soldier does not demand more than he is entitled to by the tariff, or irregularities and acts of violence may ensue.

Agency by which Supplies are obtained.

The chief agencies by which supplies are procured in time of war are:—(1) Contract, (2) Purchase, and (3) Requisition or Contribution.

Supply by Contract.

The system of delivering supplies by contract, excellent in time of peace, is not generally found advantageous in time of war. The great objections to contracts in time of war are (1) their publicity, and (2) the contractors are human, and are often powerless to carry out their contracts at the most critical moments, or become victims to panic.

Not generally employed in war.

Objections.

The accumulation of supplies demands secrecy, both from strategical and economical considerations. The publication of the conditions of a contract gives the enemy a clue to the plan of the campaign; while, in the necessity for communicating to the contractors the exact distribution and detailed marches of the troops, such information may easily reach the enemy. From an economical point of view, the publicity of the contract will cause prices of supplies to rise in the places where they have to be purchased.

Possible cases of employment.

The only time, as a rule, when contract is possible is when the army is at a distance from the theatre of war; for instance, to deliver supplies at the base of operations or for the troops mobilised for home defence, or for our Colonial wars when there is no necessity for concealing the plan of campaign. But even in these cases it is inadmissible when secrecy is required.

Contracts are made either on a public or private tender. The latter avoids to a certain extent the publicity of an advertisement. Experience can alone decide whether a contract is feasible, and if so whether public or private.

German experience.

The German Government, in 1870, contracted for large deliveries of supplies at the primary base on the Rhine, and also for supplies to be delivered in the frontier districts. The first-mentioned gave satisfactory results, but the last were unsatisfactory, chiefly because the contractors could not carry out their arrangements owing to the use

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Russian experience.

of the railways being denied to them. In the Russo-Turkish War of 1877-78, the Russian Government contracted for the supply of their whole army beyond the frontier, but the system turned out a complete failure.

British experience.

As regards the experience of our own army, contracts have sometimes proved advantageous, at other times the reverse. In the Peninsula and in Belgium, contracts were employed with varying success. Before Waterloo was fought, the contractors deserted their engagements for fear of Napoleon, and had the result of the engagement been otherwise than it was, the British Army would have been in a sorry plight. In the Afghan Campaign 1878-80, the contracts for the meat of the South Afghanistan field force turned out a failure. "As long as everything ran smoothly the contractor made large profits, but when difficulties arose he had to be supported by civil or military aid, and without any corresponding advantage."*

Indian experience.

Supplies by Purchase.

The system which has had the widest application in the British army is that of purchase through the Commissariat. In the Peninsula, the troops lived mainly by purchases on the spot, supplies being brought voluntarily to their markets. Sons of local merchants and others were employed as intermediaries in the negotiations for supplies. The good-will of the inhabitants, a most important factor, was thereby secured.

Peninsula experience.

German experience.

In the war with France in 1870-71, when, in the country to the north of Orléans, the ordinary requisitions failed to produce any effect whatever, and the Intendance of the 2nd Army, at their wits' end for supplies, opened markets, it was found that the inhabitants, attracted by the high ready-money prices offered, brought supplies in abundance, especially oats, of which there was great want in the army. The competition for selling speedily lowered the prices.

Purchase by troops.

Lastly, there is the system of supply through the troops purchasing for themselves. It is not applicable to large bodies concentrated in a small area or for troops on the move. The several regimental agents will be bidding against each other and possibly against other buyers, causing prices to rise; they are also in most cases ignorant of the language, a circumstance which may lead to misunderstandings and disputes, and ultimately to failure

* Bombay Government Report.

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in the object; moreover, the system produces complication of accounts.

Supplies by Requisition and Contribution.

The exceptional conditions of modern war have given birth to exceptional modes of supply, namely (1) Requisitions, and (2) Contributions.

A requisition, as now practised in the armies of the Continent, is the forcible collection of supplies in kind; a contribution is the forcible collection of money from the inhabitants.

Advantages of payment.

The forcible character of the requisition may be advantageously mitigated by payment at a fixed tariff. A contribution, however, remains in all cases a forcible levy. In this case money is raised by the civil authorities of a town proportionally to the known wealth of the inhabitants; it is then handed over to the invader, who pays therewith for supplies in kind.

Principle of requisitions.

Requisitions may be made not only in the enemy's country, but also in the country of an ally or in one's own country. In an enemy's country the levy is made by right of conquest in the manner the Commander-in-Chief may find most convenient; in the country of an ally the requisition is made at rates mutually agreed upon for payment in money or bills; lastly, in one's own country, at rates fixed by the Commander-in-Chief, such supplies being paid for in money or bills, which at the end of the war are redeemed or taken in lieu of taxes.

In these matters the right of the stronger rules. But the interests of the army itself demand that requisitions should be made systematically and with perfect order. If there is no system, waste ensues, and the local means will be speedily exhausted. The army cannot live in an exhausted country; discipline suffers and demoralisation results.

Hence, in all armies the principle is recognised that requisitions can only be made by the Commander-in-Chief, and according to regulations made by him and communicated to the troops and the inhabitants of the theatre of war by proclamation.

Different modes of requisition.

Requisitions are classed in two categories (1) regular; (2) troop.

Regular requisitions.

1. *Regular requisitions* imply that the demands are equalised among the inhabitants by agreement between the Commissariat and the local authorities. The troops

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take no share except in protecting the Commissariat officials and overawing, if necessary, the population.

Troop requisitions.

2. *Troop requisitions* are made by the troops themselves with the aid of the local authorities, or by their own arrangements. This kind of requisition is only allowed in extreme circumstances: when it is necessary to satisfy at once most pressing necessities, and the longer process is not applicable. It does not admit of an equalised collection, and with the least weakness of the commander may degenerate into plunder and marauding.

Disadvantages.

The irregularities in requisitioning in the Peninsula by the British troops gave rise to repeated and stringent orders by Lord Wellington.

German experience.

In the war of 1870–71 the Germans introduced at first the element of intimidation for obtaining supplies—threatening influential citizens with death in the event of the requisitions not being satisfied; but they afterwards found that supplies were more readily obtained by purchases for cash, although the money was not their own, being raised by contributions.

Russian system in 1877–78.

During the Russo-Turkish war of 1777–78 the requisitions were of three kinds—(1) through the civil administration of the district occupied by Russian troops; (2) by the troops directly; and (3) by the Etappen Commandants within their districts. Payment was made to the inhabitants, when neutral or favourable, according to a tariff fixed by the civil authorities. In many cases the Bulgarian inhabitants of their own free-will supplied the troops with all they required, and refused payment.

British system in Afghanistan.

In the Afghan campaign of 1878–80 the system of requisitions on payment was constantly employed. On the march, with the enemy in the vicinity, or through districts known to be hostile, or when the inhabitants, from fear of subsequent reprisals at the hands of their own disaffected countrymen, hesitated to bring in provisions, it was the practice, on arrival in camp, for a foraging party to be detailed to levy requisitions. The party was always under the command of a European officer detailed in orders by roster of the different corps, or under the Brigade Commissariat Officer himself, and was accompanied by a native agent conversant with the language, and a bag of money.

The officer, on reaching camp with the advanced parties,

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would get hold of a head-man, if possible, and learn from him the nature and amount of provisions obtainable at the different villages within reach. On this information the Brigade Commissariat Officer would decide the number of animals necessary to accompany the foraging party, and would intimate to units as they came up the proportion required from each.

The supplies so collected were either distributed at once to regiments or corps on indent, if their supply transport was not already filled up, or else carried as reserve by the Brigade Commissariat Transport. When supplies were abundant, every endeavour was made to load all the available animals of the brigade, so as to keep the reserve as full as possible; and often a demand would come late at night for all spare animals to be handed over to the Commissariat before the next day's march, for the purpose of conveying extra supplies from the Commissariat camp.

The prices paid were fixed by the Commissariat Officer in consultation with the Political Officer attached to the column, and payment made on the spot in presence of an officer.

In districts where green crops were standing, the Commissariat Officer, in consultation with the Political Officer, determined the price to be paid for grazing the animals of the column; and each regiment or corps was assigned its portion by the Quartermaster General in conjunction with the Commissariat Officer. The animals, while grazing, were under the charge of a general brigade guard or regimental guards, with mounted vedettes forming a cordon round them. Similar guards and pickets were told off to protect the grazing grounds of the camels, and also the grass-cutters sent out to cut forage.

Account for supplies with Commissariat (Afghan Campaign, 1879–80).

The supplies were in this way drawn from the Commissariat Officer, and regiments or corps furnished monthly a Ration Return, on the form given on pp. 336–7, which was checked by the Daily Indents and also by reference to the Brigade Major's "Present States." The form there shown was that in use with the Commissariat Department in North Afghanistan, and was found simple, sufficient, and easy to keep on field service. The "Transport Forage Return" was of a similar kind, and accounted for the number of animals of each class, attendants, daily casualties, and daily expenditure of each separate article of food.

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Quartermaster's Diary or Ration Return (Native Infantry)

Date.	Fighting Men.	Regimental Followers.	Camel Men.	Mule Men.	Donkey Men.	Ata.	Dhal.	Ghi.	Salt.	Meat.	Rum.	Tea.	Sugar.	Wood.	Rice.	Remarks.
1	710	68	40	39	20	...	...	...	...	...	...	...	...	...	...	1 Sepoy died, 9 detached as Signalling Escort, 7 Mule Men returned to Transport, 3 Donkey Men joined from Transport.
2	700	68	40	32	23											
3																
4																
&c.																
Total expended																
Total received as per Reverse..																
Balance on 31st																

On the reverse side of this Return would be shown the Daily Receipts against the Indents. See p. 337.

Cash Account.

Received from Treasury Chest								
Date.	Voucher No.	Purchased.						
—	—	Sheep	at	...				
—	—	—		...				
	Total expended					...	...	
	Balance					...	...	

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Receipts.

Date.	Indent No.	Ata.	Dhal.	Ghee.	Salt.	Meat.	Rum.	Tea.	Sugar.	Wood.	Rice.	Remarks.
Total received												

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The English Commissariat employ the form shown on the opposite page. This form is a leaf out of a book of ration returns like a cheque book, the left half being a counterfoil. A page is torn off and given as the return. It is suitable for individuals or corps, and is equally applicable for one day or any number of days. Unlike the Indian form, the cash payment forms a separate transaction.

Forms analogous to the Indian form have been tried by the English Commissariat, wherein are shown the daily issues, which are supposed to tally with the effective as shown by the pay lists, but such detailed returns have been abandoned as impracticable on field service, and now the form of Army Book 55 is the only one recommended for use.

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REGIMENTAL.

RETURN of from to

Regiment for Provisions, &c., for 18 , both days inclusive. days.

Effective.	No. of Persons.	No. of Horses.	No. of Rations of Provisions.	Spirits.	Forage.	Extra Oats.	Fuel.	Oil.
Field Officers								
Captains								
Subalterns ...								
N.C. Officers, rank and file								
Servants, not Soldiers ...								
Women at half allowance, Provisions only ...								
Children at fourth do. ...								
Horses { Officers' / Troop ... / Draught }								
Lanterns ... ... No.								
Total								

Commanding Officer.

Received from		
Bread, lbs.	Oats,	lbs.
Biscuit, ,,	Barley,	,,
Fresh Meat, lbs.	Hay,	,,
Salt ,, ,,	Bran,	,,
Preserved ,,	Straw,	,,
Sugar, lbs.		
Coffee ,,	Spirits, galls.	
Tea ,,		
Salt ,,	Lime Juice	
Pepper ,,	Sugar for do., lbs.	
Vegetables, ,,		

Wood, lbs.
Oil, pts.
Wick, ozs.
Candles, lbs.

Quarter-Master.

RETURN of from to

Regiment for Provisions, &c., for 18 , both days inclusive. days.

Effective.	No. of Persons.	No. of Horses.	No. of Rations of Provisions.	Spirits.	Forage.	Extra Oats.	Fuel.	Oil.
Field Officers								
Captains								
Subalterns								
N.C. Officers, rank and file								
Servants, not Soldiers ...								
Women at half allowance								
Children at fourth do. ...								
Horses { Officers' / Troop ... / Draught }								
No. of Lanterns ... No.								
Total								

REGIMENTAL.

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